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APRIL 29, 2002 ■ VOLUME 19, NUMBER 17

NetworkWorld

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4/29/02

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DANIEL ADEL

NetworkWorld 200

The biggest companies in networking took a beating in 2001, but are working hard to right themselves. We share the details on how they fared and what the future holds.

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- The outlook for infrastructure, enterprise software and carrier markets.
- 2001 review and 2002 predictions from six industry luminaries.
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Juniper's 'Gibson' core router.

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Forums

Should vendors pay for security holes in their software?
Would liability stifle creativity, or should we hit vendors in the pocketbook? Experts debate and folks weigh in for a heated discussion. Roll up your sleeves and join in. **DocFinder: 9135**

Network World 200
It's our annual look at the biggest networking companies, which took it on the chin in 2001 but are planning to battle back to bigger profits in 2002. We've got lots of online resources at your disposal, including the Compare-o-Matic, in which you can comb through our customizable database for more detailed information on the NW200 companies and see how they fare against their competitors. **DocFinder: 9136**

Seminars and Events

Wireless ready?
Is your network ready for wireless? Find out with our free Tech Update "Integrating and managing wireless in your network" event. **DocFinder: 8546**

Columnists

Compendium
More evil spyware
Fusion Executive Editor Adam Gaffin alerts you to a strain of even more dastardly spyware, which not only monitors your PC moves, but also deletes any antispyware software you have installed.
DocFinder: 9137

Help Desk
Getting NDS and Active Directory to talk
Columnist Ron Nutter offers a reader advice on how to make NDS and Active Directory play nice.
DocFinder: 9138

Home Base
Mitigating new managers' mistakes
Net.Worker columnist Jeff Zbar outlines why you can't treat teleworkers like they're in-office employees.
DocFinder: 9139

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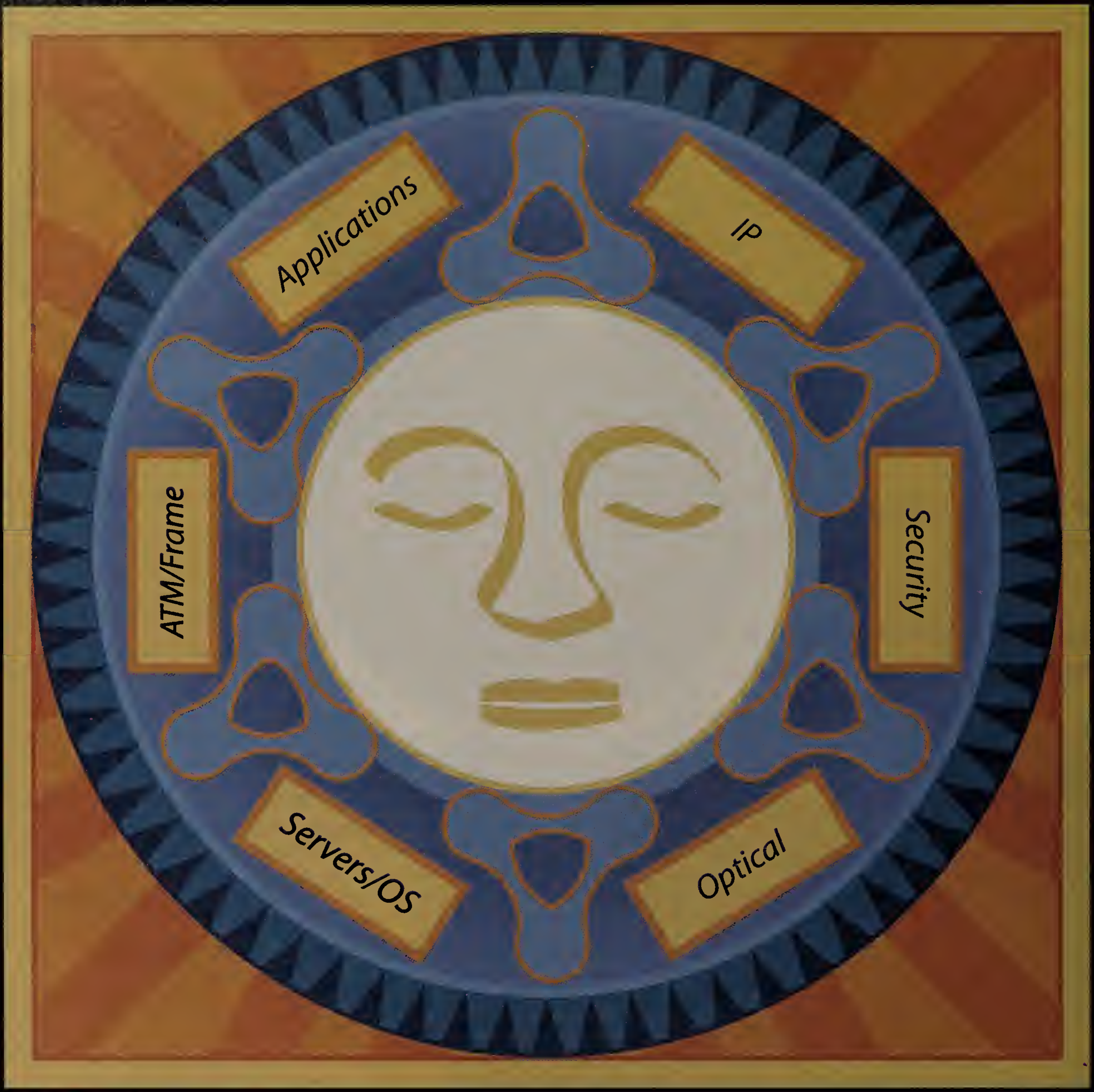
network chi



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News

Mgmt. vendors look to open eyes at N+I

Companies plan to debut wares designed to better monitor control of networks, systems and applications.

■ BY DENISE DUBIE

LAS VEGAS — Network management vendors next week will be out in droves at NetWorld+Interop 2002 Las Vegas to show off wares designed to help companies ensure their networks, systems and applications meet expected service levels.

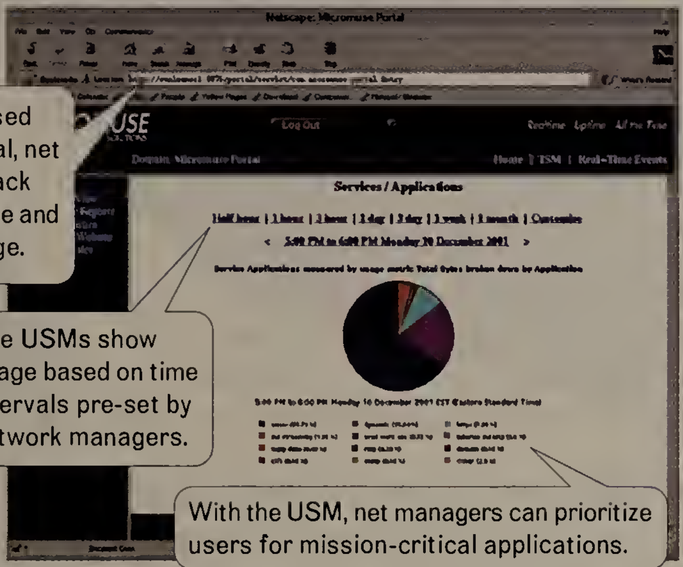
Micromuse, BMC Software and Aprisma Management Technologies are among the companies that will try to make a splash at the show.

Micromuse will launch software modules, called Usage Service Monitors, that track and record network and application-resource usage by individual and time of day, among other measures. Along with the company's NetCool/Omnibus fault management software, the offering could give customers a more comprehensive read on how their networks perform and why certain problems crop up.

The $80,000 software package consists of Solaris or Linux server software and adapters that run on whatever network device or application server is being monitored. IT resources that can be monitored include routers, switches and firewalls and applications such as those from SAP. The adapters capture use and bandwidth-consumption data on network devices and applications and feed it to the server software, which serves as a repository accessible to net administrators via a Web interface.

Use what you got

Micromuse's Usage Service Monitors (USM) show net manager who uses what and when.



Via the Web-based Micromuse portal, net manager can track bandwidth, device and application usage.

The USMs show usage based on time intervals pre-set by network managers.

With the USM, net managers can prioritize users for mission-critical applications.

"[Micromuse] is now watching how the network is being used, and that can help net managers prioritize which applications need more bandwidth and which devices run more smoothly," says Paul Bugala, a senior analyst at IDC.

Micromuse also will announce Version 2.2 of its Internet Service Monitors. This software lets customers simulate Web site transactions and capture performance data, and the new version lets companies do this even as a Web site visitor switches from the unsecure part of a Web site to the secure part supported by HTTPS. The software can track every step a Web site visitor takes, letting the company see where performance might suffer.

SHOW PLANNER

NETWORLD +INTEROP

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Get more information online.
DocFinder: 9133
www.nwfusion.com

Another fault-management vendor, Smarts, will use N+I to show off its performance-management software, a new offering called Application Services Manager (See, www.nwfusion.com, DocFinder: 9132). The software collects and aggregates performance data from other Smarts products or third-party agents. Smarts says it has written into its software the "symptoms" of problems that could occur with network devices, applications or systems.

Already strong in systems and application performance management, BMC plans to use Interop to show it can play in the network management market, too.

BMC will announce its Network Module for Service Reporting, which collects data about network response time, bandwidth utilization and availability from routers, switches and other network devices. Companies can then use the software to generate canned or customized reports about that data, accessible via HTML or PDF. BMC has not released pricing information.

The product works by itself or with Patrol, BMC's systems and application management software, to deliver service-level

See N+I, page 16

Galileo travels down Web services path

New applications designed to provide customized information.

■ BY JOHN FONTANA

DENVER — Galileo International is cracking open the proprietary systems and networks it has run for 30 years, a move aimed at revolutionizing and personalizing the way it does business.

WebServices
EARLY ADOPTERS
Third in a three-part series

The preeminent distributor of fare and booking information for the travel industry is deconstructing its entrenched applications, such as those for handling airline fare inquiries and ticket booking, into Web services components with interfaces based on Simple Object Access Protocol (SOAP). The intent is to turn what is today a one-size-fits-all approach to dispensing travel information into a pliable environment where customers can stitch together Web services components into customized applications that can be accessed from any platform.

Galileo is testing four Web services with major customers and hopes to deploy them soon. These include services for creating itineraries, booking travel, encoding and decoding airport and destination information, and providing updates on plane status after takeoff. In the future, Galileo plans to create as many Web services as customers demand.

"The first four are the very biggest blocking and tackling components," says Todd Dubner, vice president of product innovation for Galileo. One example is the Itinerary Inquiry, a Web service — or what Galileo calls a SOAP service — that returns flight, car and hotel availability based on a given destination and date.

■ A new offering aims to speed up processing of SOAP messages. PAGE 14

■ Computer Associates embraces Web services. PAGE 16

The data has always been available from Galileo, but to get it out of its proprietary systems and network, customers had to endure a series of steps including authentication to the various sets of data, and individual

See Web services, page 12

News Bits

Microsoft patches Outlook vulnerability

■ Did we hear someone say "Yet another"? … A security vulnerability that could affect users of Microsoft's Outlook 2000 and 2002 who use Microsoft Word as an e-mail editor has been patched, according to Microsoft. The vulnerability results from different security settings in the two applications used when an e-mail is being read and when it is being written. When an e-mail is displayed in Outlook, the program uses the security settings of Internet Explorer, often configured to disallow the execution of scripts. But when the e-mail is replied to or forwarded using Word as the application to write the e-mail, Word's security settings are used, which let scripts run. If an attacker were to send an HTML e-mail containing a script to a user who had his PC configured this way, any code of the attacker's choice could run on the target PC if the user replied to or forwarded the e-mail. Users who have applied Office XP Service Pack 1 are protected against this hole, the company says.

VeriSign posts loss, announces layoffs

■ Citing lousy domain-name sales and tight corporate IT budgets, VeriSign reported lower-than-expected sales for the first quarter and plans to lay off 10% of its workforce. The company changed its outlook for the year in anticipation of continued softness across all its markets — retail domain-name sales, enterprise security services and Internet database lookups — in the next two quarters. "Our first-quarter results were not up to our expectations as we encountered significant spending delays in our IT and telecom customer bases," CEO Stratton Sclavos says. VeriSign lost $27 million on sales of $328 million in the quarter ended March 31. These figures compare with a loss of $1.3 billion on sales of $213 million in the first quarter of 2001. VeriSign employed 3,500 people before the layoffs.

Network Associates backs off bid

■ Just as Network Associates' purchase of McAfee.com seemed on the verge of completion, Network Associates last week withdrew its $225 million offer for the security services and software company it spun off in 1999. Network Associates retains approximately a 75% share in McAfee.com. Financial turmoil seems to be the reason for the deal going awry, with Network Associates saying it discovered "accounting errors" in its 1999 and 2000 financial statements and would have to restate earnings for those years. Network Associates disclosed in past weeks that the Securities and Exchange Commission was investigating its accounting practices.

RSA reduces workforce by 17%

■ Facing a quarterly loss of $14 million, RSA Security last week announced the layoff of 200 employees, or 17% of its workforce. Most of the cuts were in engineering and sales. The company also said it is reorganizing its engineering and product-management staff into three product divisions: authentication, developer solutions/encryption and Web access management. RSA's sales, marketing and administration will continue to operate as separate groups serving the entire corporation.

CA, Justice Department settle suit

■ Insisting it did no wrong, Computer Associates nonetheless agreed to fork over $638,000 to settle a civil suit brought by the U.S. Department of Justice. The Justice Department had charged that CA and Platinum Technology took part in conduct known as "gun jumping," or violating premerger waiting-period requirements and price-fixing laws. The Justice Department said CA agreed that Platinum would limit its price discounts and other terms it offered customers during the mandatory premerger waiting period. Without admitting to any wrongdoing, CA agreed to pay the government the original $638,000 the Justice Department asked for when filing the charges in September 2001. CA acquired Platinum in 1999. For more CA news, see page 16.

W32.Klez worm still wriggling

■ The W32.Klez worm and its variants were still causing problems late last week, prompting antivirus software vendor Symantec to upgrade it to a "level 4 virus threat" on its danger scale of five. Symantec said it was receiving more than 3,000 submissions per day of W32.Klez and its variants. At the peak of the SirCam virus, in mid-2001, the company received about 1,500 daily submissions, Symantec said. W32.Klez.H, the latest variant of the W32.Klez mass-mailer worm that first surfaced last year, was discovered April 17. A variant of a worm contains attributes of the original but has been altered so that it behaves differently. Updated virus signatures from leading antivirus software vendors should protect against the worm.

PDA sales take another pounding

■ Could it be that everyone who wants one has one? Worldwide demand for PDAs continues to decline as manufacturers attempt to switch from selling electronic organizers to handheld wireless devices, according to IDC. Global shipments of PDAs in the first quarter of this year (about 3.25 million units) fell 12.1% vs. the same quarter in 2001, and dropped 25.4% compared with the fourth quarter of 2001.

■ TheGoodTheBadTheUgly

Yahoooooooo Ooooooooooo!

Yahoo for yodeler. Internet portal Yahoo last week did the right thing and settled a copyright infringement lawsuit filed by Wylie Gustafson, the yodeler heard in the company's advertisements. Gustafson originally was paid $590 for what he understood was a regional promotion before the company hit it big. Gustafson told the Associated Press that the settlement — terms of which weren't publicly disclosed — showed that Yahoo "wanted to do the right thing and pay for a vocalization that has become a worldwide trademark." ➤

Our bad. When Computer Associates announced awhile back that former New York Mayor Rudolph Giuliani would give a keynote speech at last week's CA World, we hooted the choice as inappropriate for a technology conference. Seems we were wrong, at least according to the almost 10,000 attendees who heard Giuliani speak — and gave him a standing ovation.

Wait 'til next year. While Lucent had plenty of company in reporting tough financial results last week, the company's streak of what is now eight straight quarterly losses stood out. On the bright side, the company says it plans to turn a profit next year. (Though earlier this year Lucent said it would turn that profit by the end of 2002.)

Correction

■ A recent news brief (April 15, page 39), which cited a Gartner study on Ethernet services, should not have included Telseon among carriers that have filed for bankruptcy protection.

Managing the storm of enterprise data

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NAP190

EMC touts low cost of new storage device

■ **BY DENI CONNOR**

NEW YORK — A new breed of storage device from EMC promises customers a relatively inexpensive option for keeping large amounts of fixed data — stuff that isn't going to change — where it can be easily accessed instead of banishing it to cumbersome tape archives.

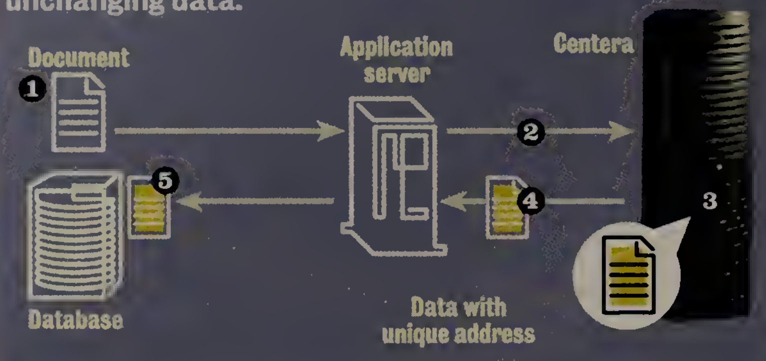
Called Centera, the device is a hardware array with embedded software that sits on an Ethernet network and handles the storage of content such as electronic documents, movies, e-mail, check images and broadcast content.

Steve Duplessie, senior analyst for Enterprise Storage Group, says that in five years, the bulk of data on a network will be of this fixed type that is unchanged over time.

"The nature of the data we are storing is going to dramatically change from simply transactional, relatively small block data to very large file, intelligent, reference data, such as rich media," Duplessie says.

EMC's Centera

Hardware and embedded software handles fixed, unchanging data.



① Data is created by an application or migrated to the Centera array as archival data.
② The data is sent to Centera via an API over IP.
③ Centera generates a unique address for the data, which lets it be retrieved faster than with traditional storage.
④ The Centera software returns the unique address to the application.
⑤ The unique address is retained for future reference, so data can be retrieved quickly.

Robert Mossi, a product manager with online back-up provider Connected in Framingham, Mass., has Centera in production to archive terabytes of files.

"We are storing PC data archives on Centera because it is just as scalable as EMC's Symmetrix and the disk [it uses] is actually cheaper," Mossi says. "When a user does daily backup, the capture is sent to Centera. When the [data capacity] reaches a certain size limit on Centera, older data is migrated to tape."

Traditionally, Data is accessed by its physical location on the disk, making it cumbersome and slow to retrieve. Centera accesses data by a unique address its software assigns to data objects.

This address lets data be accessed quickly despite the size of the data repository or where its parts are located on the disk. Applications that are Centera-aware retrieve stored data using the address, without having to know the location of its pieces.

Storing reference data on traditional RAID arrays that are designed for transactional data is a waste of money, analysts say.

Centera uses inexpensive Integrated Drive Electronics (IDE) drives to store data, allowing storage for as little as 2 cents per megabyte.

The Centera array attaches to a network via three 10/100 M bit/sec Ethernet adapters. An API lets developers integrate application software with the device, so data is saved correctly and accessed efficiently, EMC says.

Centera competes with network-attached storage devices from Maxtor, Quantum and Network Appliance. While these devices use the same IDE or ATA drives for storing data, they differ in application — they are used primarily as near-line archival storage or as a staging area for back-up data. The Centera software provides the additional content-management function, which makes retrieval easier.

Centera is available in configurations from five terabytes to more than a petabyte in size. Pricing starts at $205,000. ■

New LAN gear may put Nortel back in the game

■ **BY PHIL HOCHMUTH**

Nortel this week will unveil new stackable switches aimed at making enterprise edge connections more resilient and convergence-ready. Meanwhile, the embattled vendor hopes the products will revive its dormant enterprise network business, observers say.

Nortel's BayStack 470-48T could help IT departments pack a large number of network ports into a small area while improving on basic Layer 2 connection reliability between a wiring closet and the enterprise core, according to the company. The BayStack 380-24T is aimed at connecting high-end PCs and workstations with Gigabit Ethernet to the desktop.

The 470-48T is a Layer 2 switch that crams 48 10/100M bit/sec ports in a single-rack unit space. Gigabit interface converter (GBIC) module slots on the box can be used for uplinks to a backbone or to other switches or servers. The box also includes an integrated "cascade" stacking module for stacking up to eight switches together to act as a single device. The technique lets the stack be maintained in case of a switch failure.

The integrated stacking module caught the interest of Bruce Meyer, senior network engineer at ProMedica Healthcare in Toledo, Ohio.

"Right now, I have to pay another $400 to stack my [BayStack] switches together," because a separate stacking module was required to link older BayStacks, Meyer says.

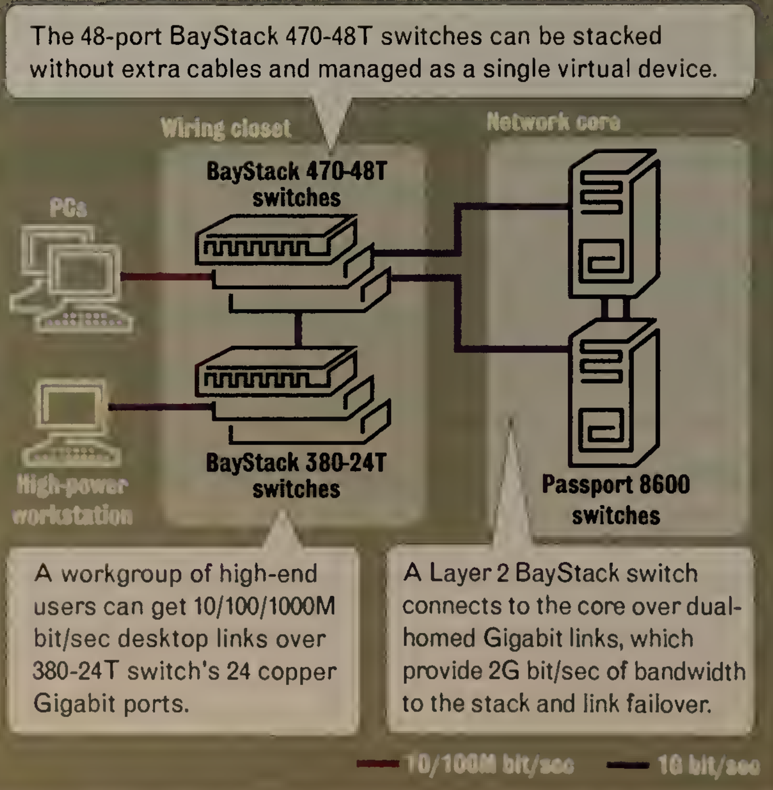
The 470-48T lets users choose from three types of quality-of-service (QoS) technologies. While it is a Layer 2 device, the 470-48T can recognize Layer 3 and Layer 4 QoS information in packets, with support for Type of Service and Differentiated Services QoS methods. The switch also can provide Layer 2 802.1p traffic prioritization and 802.1Q virtual LAN tagging.

The 470-48T also supports Nortel's Split Multilink Trunking (Split MLT) technology, an alternative to Spanning Tree Protocol (STP), the standard Layer 2 method for link failover and loop prevention. Split MLT lets a BayStack switch support separate live connections to two backbone switches, known as dual homing. This technique provides BayStacks with a 2G bit/sec uplink and a one-second failover in the case of a downed connection, but STP does not allow for live dual homing connections and takes up to 45 seconds to fail over.

For power users, Nortel's 380-24T switch provides 24 10/100/1000M bit/sec copper-based Ethernet ports, along with two GBIC uplinks. The box supports the same QoS and Split MLT functions as the 470-48T, and is aimed at users who require Gigabit Ethernet desktop connections, such as graphic artists who create bandwidth-intensive graphics or financial traders who require multiple real-time market data feeds piped to their workstations.

Nortel stacks up

Nortel's new BayStack switches promise improved reliability and bandwidth with Split Multilink Trunking and Gigabit Ethernet to the desktop.



The 48-port BayStack 470-48T switches can be stacked without extra cables and managed as a single virtual device.

A workgroup of high-end users can get 10/100/1000M bit/sec desktop links over 380-24T switch's 24 copper Gigabit ports.

A Layer 2 BayStack switch connects to the core over dual-homed Gigabit links, which provide 2G bit/sec of bandwidth to the stack and link failover.

The two new BayStacks are the latest in Nortel's line of fixed-configuration workgroup switches, and will compete with products such as Cisco's Catalyst 2900 series and 3550 XL, 3Com's SuperStack 3 Switch 4400 and Foundry Networks' FastIron 4802.

The 470-48T and 380-24T will be available in June for $4,500 and $8,000, respectively.

While Nortel's latest switches are not based on earth-shattering technology, analysts say, the products could be a sign that Nortel is poised to make a comeback.

But any such move will be more of a marathon than a sprint, as Nortel was fifth in Ethernet port shipments in 2001, down from third place the previous year, according to In-Stat/MDR.

"Nortel is losing market share" as smaller competitors, such as 3Com, Hewlett-Packard and Allied Telesyn have grown, says Lauri Vickers, an analyst with In-Stat/MDR. "They're still in [the enterprise market], but they don't show as much emphasis toward it as other areas, like optical." ■

Experiencing IP Voice

Experio Solutions cuts costs and management headaches with nationwide Shoreline IP voice network.

WHEN MIKE SHISKO set out to look for a new phone system that would serve the 480 employees in his company's 14 offices throughout the United States, he did not have IP voice in mind. Shisko is director of information technology for Dallas-based Experio Solutions, an IT consulting firm created by Hitachi when it acquired a piece of a large consulting company. After the sale, Shisko was essentially given a clean slate on which to map Experio's voice and data strategy.

Shisko already had significant experience working with private branch exchanges (PBXs), having held responsibility for telecom as well as data networks for the previous six years.

Eventually, he came across an IP voice system from Shoreline Communications. Shisko was initially attracted to the Shoreline3 suite of IP voice products because it offered a single point of administration, a consistent feature set for offices of all sizes, and easy connections to the public switched telephone network (PSTN) for local calling and backup – all at a reasonable price. Since installing the system, he's also found it to be highly reliable and even more cost-effective than expected, given reduced administration costs and savings in long-distance charges resulting from shipping calls over the Internet.

Shisko's positive experience is due in large part to Shoreline's approach to IP voice. Rather than try to retrofit a PBX or router to take on functions for which they were never intended, Shoreline3 was designed solely to offer reliable voice services over an IP net.

There are a couple of keys to the reliability built in to Shoreline3. First are the ShoreGear voice switches that provide call setup and teardown functions. All switching functions are performed in hardware using Shoreline's VxWorks, a real-time operating system similar to that used in pacemakers.

"In the legacy PBX world, five nines reliability is a familiar benchmark," says Greg Ness, director of marketing communications for Shoreline, referring to systems that are operational 99.999% of the time. "With a pacemaker, five nines isn't good enough. A few minutes of heart failure per year isn't a positive thing."

In addition to running on a highly reliable hardware platform and OS, each ShoreGear switch operates independently, without involving a central server, which means there is no single point of failure. Each switch also has its own connection to the PSTN and can provide dial tone for attached end devices, even during a power failure.

Experio's Mike Shisko is now an IP voice believer.

The ability to connect to the PSTN was an important consideration for Experio's Shisko. "We wanted a local dial tone in each office, and a lot of systems made that difficult to manage," he says. By contrast, once installed, each ShoreGear switch instantly finds the others, enabling a new office to start benefiting immediately from toll bypass. And the Shoreline equipment typically took only about two hours to get up and running.

The savings to be realized from toll bypass are significant. Whereas Experio previously paid about $2,000 per office per month in long-distance charges, now it pays about $2,000 for all offices combined (see chart).

Administration costs have likewise dropped dramatically, he says. As compared with the PBX setup in use before the Hitachi acquisition, Shisko estimates the Shoreline gear cuts management costs by about 60%. He says the Web-based administrative interface is simple to learn and use, and configuration changes can be delivered at once to all ShoreGear switches. Previously, each PBX change had to be administered separately, a time-consuming process that also made it difficult to keep configurations uniform over time.

Hardware acquisition costs were likewise reasonable, because ShoreGear switches of all sizes support the same feature set. Users can start with a 12-port model and add capacity as requirements grow. That's a welcome feature for Experio, which now has 785 employees in 21 offices, barely a year after its initial Shoreline deployment.

Harder to quantify is the productivity gains that come from the applications included with the Shoreline3 system. These include personalized call control and management, a Windows program that enables users to control features such as multiparty conferencing, one-click dialing and screen pops that show callers' names. A Unified Messaging application is integrated with Microsoft Outlook, including the ability to coordinate call-handling features with Outlook calendars. Another feature, AnyPhone, lets Experio employees who travel frequently assign their extension and call-handling profile to any other phone in the network.

"The ability to have all your contacts available for dialing, to be able to cut and paste numbers off Web sites and dial them, to know who's calling you and to see voicemail in your email inbox –people have fallen in love with all that functionality," Shisko says. "Shoreline was a good decision for us. It's proven to be very cost-effective and flexible, and it's done everything we were looking for it to do."

Experio saves big with Shoreline

Per Site Acquisition Costs	Shoreline	Legacy PBX	Net Savings
Equipment, Network Upgrades	$30,000	$60,000	$30,000
Installation - Hard Cost	$0	$1,700	$1,700
Total Per Site Acquisition Costs	**$30,000**	**$61,700**	**$31,700**
Total Acquisition Costs (x16)	**$480,000**	**$987,200**	**$507,200**
Annual Costs			
Management	$39,600	$72,000	$32,400
Maintenance (based on 10.1%)	$48,480	$129,280	$80,800
Long Distance	$30,000	$151,000	$121,700
TCO Per Year	**$118,080**	**$352,280**	**$234,200**
Total Over 5 Years			**$1,678,200**

For more information, see www.goshoreline.com.

C&W building new global IP network

■ BY DENISE PAPPALARDO

Cable & Wireless is building a new global private IP backbone to support converged voice and data services that feature real-time performance guarantees.

The company announced the construction of its network along with a four-year comarketing and technology deal with Cisco last week.

C&W is using Cisco gear throughout its private IP network to support VPN, voice-over-IP and video-over-IP services. Cisco and its value-added resellers will offer the carrier's IP Convergence services when they become available in the second quarter.

The network will run parallel to the carrier's public IP network, using Cisco 12000 and 10000 series routers at the core and 7000-series routers at the edge to support multiple classes of service using Multi-protocol Label Switching (MPLS).

"Cable & Wireless is taking a conservative approach to its MPLS rollout, which is probably the smart way to go at this point," says Brownlee Thomas, an analyst at Giga Information Group. With competitors such as Equant, with 500 customers on its MPLS network, and Infonet, with about 270 customers on its MPLS network, "we're still talking about a small amount of demand," she says.

But offering multiple classes of service over a predictable data network is what business users are looking for in the long term, she adds.

The network also uses the IETF's RFC 2547 specification, which stipulates how carriers support MPLS-based VPNs. C&W has been talking about offering MPLS VPN services since late last year.

A typical node will include two Cisco 12000 routers, a Catalyst 6500 router and several Cisco 7500 routers. C&W says it's using existing fiber to support the network and will not need any new fiber to support the deployment.

The first phase of the network will be deployed in seven U.S. cities in June. Although the network and initial services are slated for availability in less than two months, the company would not say which network nodes will be deployed first. Nor would the carrier say how many nodes would be deployed by year-end.

C&W says this is a global network deployment that will include nodes in Europe and Japan. The carrier says it has supported multiple nodes based on the Cisco gear in the U.K. for more than a year.

In conjunction with Cisco, C&W is developing global end-to-end converged voice and data services that will include desktop-to-desktop management. The carrier also says real-time service-level agreements (SLA) will be available with its service offering. But C&W would not describe what its standard SLA would include. ■

Web services

continued from page 7

processes to query pricing and availability related to airlines, car rentals and hotels.

Galileo has built services around all the necessary itinerary transactions and aggregated them into a SOAP service that is activated via a Web server (see graphic).

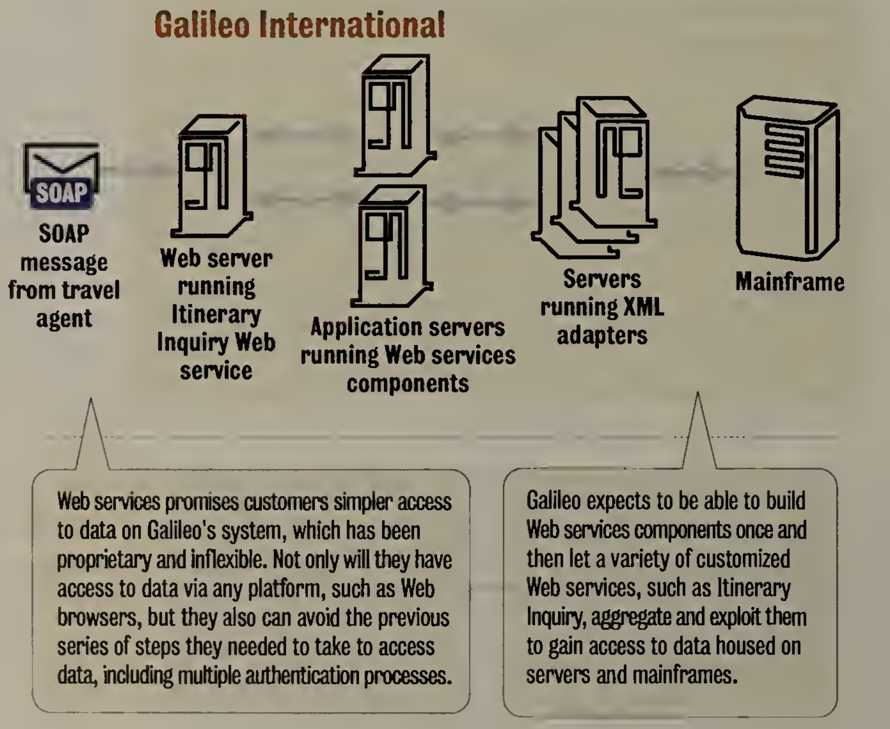
"We have 30 years of [application] development locked up in our systems that perform all sorts of functions for the travel distribution space, and they have been captive functions for Galileo that we distribute through our proprietary network," Dubner says.

The company maintains a private frame-relay network for connectivity to its travel agent customers and travel company data suppliers.

"With the inception of Web services, we can let our customers access us the way they want over whatever network they want," Dubner says. "We will modularize our global distribution system functions so a travel agency or corporate customer can arrange our business objects in such a way that they meet their specific business needs."

Bon voyage

Galileo is testing Web services to ease customer access to travel data and to simplify its own application development process.


Galileo International
SOAP
SOAP message from travel agent
Web server running Itinerary Inquiry Web service
Application servers running Web services components
Servers running XML adapters
Mainframe

Web services promises customers simpler access to data on Galileo's system, which has been proprietary and inflexible. Not only will they have access to data via any platform, such as Web browsers, but they also can avoid the previous series of steps they needed to take to access data, including multiple authentication processes.

Galileo expects to be able to build Web services components once and then let a variety of customized Web services, such as Itinerary Inquiry, aggregate and exploit them to gain access to data housed on servers and mainframes.

Big decision

But it's been no small decision for the company to tinker with its global distribution system (GDS), which is the heart of Galileo's business.

The GDS is updated constantly with fare and reservation information from 500 airlines, 227 hotel operators, 32 car rental agencies, 368 tour operators and all the major cruise lines. It handles 350 million requests for information per day and 92 billion transactions per year, and boasts an uptime of 99.95%. Last year, more than 345 million travel reservations were booked through Galileo's systems from more than 178,000 terminals in 115 countries, which generated an estimated $55 billion in travel-related services.

Galileo has spent nearly two years devising and testing its plan to roll out Web services so it enhances that operation, even though it says creating the actual Web services interfaces can take as little as a few hours. Currently, Galileo has a team of 28 people devoted to developing Web services, but that is expected to grow over time.

After all that planning, Galileo is convinced Web services isn't a risky investment.

"In terms of our capital plan for this year, while we see this as a significant growth initiative, it does not represent a significant portion of capital, so we see this as a relative low-risk investment for us," Dubner says.

In terms of development, Galileo says creating Web services has not increased its costs because new development tools automatically generate much Web services code used as interfaces to existing business logic.

Web services promise Galileo component and code reuse, foster new services such as Itinerary Inquiry, and open new sources of revenue.

The Web services also will be used for travel services on Trip.com and CheapTickets.com, two Web sites that Galileo's parent company, Cendant, runs.

Galileo also will use Web services to build components such as from Highwire, its self-booking tool for corporations, to those for profile maintenance, policy management and calendars.

"All of these things are functions that can become Web services so we build them once for one of our products and then make them available to our other customers, and in the process it saves us tremendous dollars in terms of development of new products," Dubner says.

A new world

In this new world, Galileo will host the Web services on its network, freeing itself from having to update software at client sites.

"The travel agents are no longer interacting with software inside their shop. They are interacting with Galileo via a SOAP interface and XML," Dubner says. "It gets us away from the tyranny of a release cycle."

Galileo had required users to run a Windows-based server to interact with a data language Galileo developed three years ago called XML Select, a standard way to describe concepts such as a car or hotel. XML Select converted Component Object Model components used in client-side applications into XML documents. Those documents were fed to adapters in Galileo's network that converted the XML into triggers that would touch off transactions on the mainframe.

While the adapters remain, customers no longer need the Windows-based server running in their environment.

"With Web services we are not demanding that our customers function on any specific platform," Dubner says.

Everything is executed on the Galileo network. It's a big shift but it has not meant big changes to the company's computing infrastructure except for security.

"When we exposed our product through a central point such as the host system and our own client products before, we had a much tighter control on how our users were authenticated," says Glen Zwart, principal engineer for Galileo. "Now as we start to expose that product in different ways, we have to change those models."

Zwart says Galileo is closely following standards work in Web services, but for now has created its own authentication and security mechanisms similar to what is available on the Web today.

Galileo doesn't have to scrap any of its computing platforms — including mainframes running the Transaction Processing Facility operating system and its 30-year-old processes, Windows and assorted flavors of Unix — or its IBM WebSphere application servers, Microsoft Internet Information Servers and code written with Java tools and Microsoft's Visual Studio.Net. ■

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Baltimore Tech first to add SAML

Authentication specification promises to aid interoperability.

■ BY JOHN FONTANA

Baltimore Technologies this week will release the first Web access-management software that features an emerging security protocol designed to support interoperable authentication services.

With SelectAccess 5.0, Baltimore is the first vendor to release an implementation of Security Assertion Markup Language (SAML). The company's major competitors, including Netegrity, Oblix, RSA Security and Open Network Technologies, also plan to implement the 1.0 specification before year-end.

The first version of the protocol, which the Organization for the Advancement of Structured Information Standards is scheduled to ratify in June, is an XML framework for exchanging authentication and authorization credentials.

SAML can be used between any network security boundaries. It promises to allow interoperability between disparate Web access-management systems, which are used to control access to corporate networks. That should free IT executives from product lock-ins and cumbersome gateways, advocates say.

"Many enterprises say they want to provide Web single sign-on in a standard way that is vendor neutral, and SAML is important in enabling that to happen," says James Kobielus, an analyst with The Burton Group and a *Network World* columnist. "All these access management vendors know they need to have their products interoperate, so they are behind SAML."

The major vendors will hold a proof-of-concept test at The Burton Group's annual Catalyst Conference in July.

Kobielus warns that SAML won't realize its potential unless implementations of the specification are consistent across vendors' products. That is not always an easy task, as evidenced by initial troubles to get vendors' implementations of Lightweight Directory Access Protocol (LDAP) to work together.

SelectAccess 5.0 also features a new automatic configuration service for its validation engine and its plug-ins used to tie Web servers into SelectAccess. Configurations are stored in an LDAP-compliant directory and automatically pushed out to new validation engines or plug-ins. The company also has added reporting and alerting capabilities and support for wireless authorization.

SelectAccess 5.0 costs $20 per user for 1,000 users. It runs on Windows 2000 and NT, HP-UX 11, Sun Solaris 2.8, and Red Hat Linux 7.2.

Baltimore: www.baltimoretechnologies.com

> **"Many enterprises say they want to provide Web single sign-on in a standard way that is vendor neutral, and SAML is important in enabling that to happen."**
>
> **James Kobielus**
> Analyst, The Burton Group

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Chutney seeks to speed Web services

Software focuses on eliminating redundant SOAP messages.

■ BY JENNIFER MEARS

ATLANTA — Chutney Technologies, which specializes in speeding up application processing, is turning its attention to Web services with the goal of helping companies create high-performing applications without draining IT resources.

Chutney this week is announcing its Apptimizer for SOAP software, which targets processing associated with sending Simple Object Access Protocol (SOAP) messages among applications in a Web services environment.

SOAP is the transport mechanism for Web services, which lets applications exchange XML-based information.

The trouble with SOAP is that it can put a drain on application servers because each application request and subsequent response must be wrapped in SOAP for delivery and unwrapped once it reaches its destination, says Greg Govatos, vice president of marketing at Chutney.

Chutney eliminates redundant SOAP messaging, Govatos says, by using the Apptimizer software, which includes a storage engine that runs on a dedicated server typically residing next to application servers and application libraries. Once an application request is made, the output is cached in the Apptimizer storage engine. Subsequent requests then would go to the Apptimizer, freeing the application server from extra processing. Companies set rules to determine how long content remains fresh and when the application functions must be completed again.

The SOAP capability extends the Apptimizer so that it can store the results of Web services calls, reducing the number of SOAP messages that have to be sent and interpreted, Govatos says.

Companies such as SpiderSoftware and Xcache Technologies focus on speeding the delivery of dynamic content to servers, says Michael Hoch, senior analyst, Internet infrastructure, at Aberdeen Group, but Chutney is the first company he's seen that is addressing performance issues about SOAP. Customers such as Merrill Lynch and J.P. Morgan Chase are using the technology, according to Chutney, but Hoch says overall adoption of Web services is still a ways off.

"It's a little early in terms of the big applications, but it's not early for the application designers and developers," Hoch says. "As the application developers start designing Web services and start testing Web services they're going to hit performance problems very quickly because . . . the protocols [XML and SOAP] themselves are heavy." ■

Speedy apps

Chutney says its Apptimizer software can speed traditional applications and Web services. The Apptimizer consists of a storage engine and an interface library, which are priced as follows:

Storage engine: $100,000 or $150,000 for the high-availability deployment, which includes hot failover.

Libraries: $5,000 per CPU.

- SOAP (Apache and Microsoft), available June 1
- Java/JSP
- Microsoft ASP.Net
- Microsoft ASP/COM
- C/C++
- Perl, PHP, TCL/TK

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Web services in the spotlight at CA World

■ BY DENISE DUBIE

ORLANDO — Computer Associates last week joined the conga line of companies supporting Web services, promising users ease of use, management and security for the emerging technology.

The 10,000 attendees at CA World heard the company say it plans to integrate software and development tools from across its six brands to support and manage Web services from Microsoft's .Net portfolio. The company also detailed plans for helping users manage wireless networks and storage resources.

CA will support Web services via its portal software, CleverPath 4.0, which supports key Web services components such as Universal Description, Discovery and Integration and Simple Object Access Protocol that support directory and messaging functions, respectively. CleverPath runs on a Windows, IBM AIX, HP-UX, Linux or Sun Solaris server. The software pulls data from disparate sources such as a database, a corporate intranet or company accounting records, and populates a user's desktop with that information via a Web interface.

The idea is to eliminate the need to write additional code to let devices and applications communicate with each other. CleverPath supports Java 2 Platform Enterprise Edition (J2EE) and Microsoft .Net environments, and it uses XML as a language to communicate with other third-party tools.

"Standards such as Web services expose data locked away in back-end systems, which is hard to manage and integrate," said CA's CTO Yogesh Gupta in a keynote speech.

CA's Web services kick comes on the heels of competitor IBM Tivoli's news that all its software products had been reinstrumented to support J2EE and .Net applications, and other Web services initiatives (see www.nwfusion.com, DocFinder: 9140). Hurwitz Group analyst Jasmine Noel says CA is "on track" with its Web services efforts, while IBM Tivoli is still playing catch up.

Available now, pricing for CleverPath Portal 4.0 starts at $25,000.

Also in portal news from the show, CA announced its BrightStor Portal software, which uses XML to talk with storage devices and software and displays all the data in a single management console for storage administrators. BrightStor Portal runs on Windows NT/2000, Solaris and HP-UX platforms. The tool not only gives users a one-stop shop for managing storage across their network but also performs some corrective action. When a device is introduced to the network, BrightStor Portal will use predefined rules to allocate storage and provision resources to the device and its users.

Jack Norton, senior systems analyst with engineering company Parker Hannifan in Cleveland, said in the past year, the storage needs at his company grew but his time to manage those needs did not. The built-in automation of the CA products worked best for Norton. As a BrightStor Portal beta tester since January, Norton reported that the time it took him to resolve storage issues on his network dropped from 20 hours per week to less than an hour per week.

In other news, CA announced two products that can manage wireless networks and mobile devices:

- Unicenter Wireless Network Management works without agents to perform discovery and monitoring of wireless devices, such as wireless LANs, access points and stations. Server software is installed on Windows NT/2000, AIX and Linux servers. Using sniffer-like technology with the built-in intrusion-detection software, Unicenter can sense any unauthorized users on the network. And if a rogue user attempts to tie into a wireless net, Unicenter would not allow it.
- Unicenter Mobile Device Management performs software delivery and configuration management to mobile devices such as laptops, handheld PDAs and Internet cell phones. The software runs on a Windows, Unix or Linux server and keeps track of software versions, licenses and applications running mobile devices, storing the information for inventory purposes.

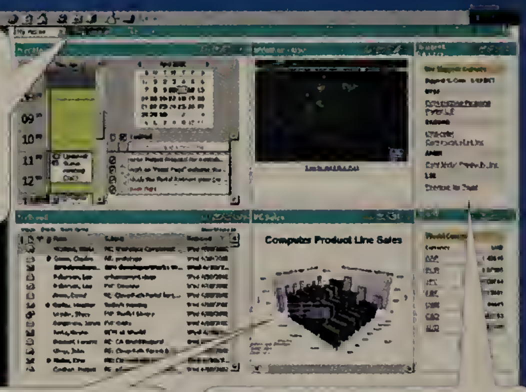
The new Unicenter offerings are in the early stages of beta use and are slated for general availability during the summer. Pricing is not yet final.

Computer Associates: www.cai.com

Stacy Cowley of the IDG News Service contributed to this story.

A cube with a view

CA's CleverPath Portal 4.0 delivers access to business resources users need directly to their desktops.



Users can design their portal to deliver personal, business and news items.

In a glimpse, CleverPath shows users how PC sales relates to stock quotes as well as the weather and world currency.

CleverPath Portal will maintain a link to external Web sites and keep updated data on user's screens.

N+I

continued from page 7

management capabilities.

"This year at Interop we're going to show customers that we're not just a point product vendor. We provide a complete enterprise management picture; we're not just in the applications space," says Gerry Roy, BMC's director of product management for network solutions.

Early last year, the company purchased Perform, a French network performance-management software vendor. Since then, IDC's Bugala says, BMC has been working to expand its network management capabilities. "The challenge for BMC is getting network operations guys to buy BMC products. [The vendors] are all scrambling to plug the management holes in their product lines and keep customers from buying a point product elsewhere," he says.

Take Aprisma, for example. This vendor is using N+I to show the latest extension to its Spectrum management system, a new offering dubbed the Web Operator Suite.

The $10,000 software is installed on a Web server and lets users personalize the Web interface to deliver information and reports based on their needs. Spectrum comes with a standard Web interface, but the add-on offers more features for users to collect data based on their preferences, search by customized models, and generate event and alarm reports. For example, a network administrator can view data on switch availability, while an application developer could monitor response times on a server.

The new Web features let network administrators group network devices with applications, services and end users, so that if a problem occurs, the software will more quickly show administrators who's affected, Aprisma says. With this real-time view of what's affected, users can map out the mission-critical applications and prioritize tasks to ensure services get up and running more quickly.

"The most important issues with a failed router, for example, is the impact on IT service overall," says Trent Waterhouse, director of product marketing for Aprisma.

The enterprise management software maker also will release two upgraded versions of Spectrum, one for large enterprise networks and one for carriers. Enhancements include support for voice over IP, wireless LAN technologies and storage-area networks.

Also at the show:

- Shunra Software will announce its Forecaster testing tool, which is designed to help companies determine if an application will run smoothly on a network and if that network adequately can support the application. It makes use of data gathered by running end-user and network transaction simulations.
- OpenService will reveal upgrades to its NerveCenter network management software and SystemWatch security management software. NerveCenter 3.7 and SystemWatch 2.7 now work better together and provide network security event management, the company says. The tools consolidate and correlate security events with network and system health information from security applications and appliances in real time.
- LSVi will promote Version 3.0 of its Enterprise Inventory Auditor asset-management software, which performs autodiscovery of desktop and server assets. The tool now can include historical information on physical assets and software usage data.
- InfoVista will announce VistaLunks, prepackaged integration modules that can be used to feed enterprise companies reports about how their service providers are living up to their service-level agreements.

N+I 20002: www.key3media.com/interop/lv2002/; Micromuse: www.micromuse.com; BMC: www.bmc.com; Aprisma: www.aprisma.com

Be a Net Know-It-All
■ THIS WEEK'S QUESTION:
Internet infrastructure software company Tarantella consists of the remnants of what company?
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Wireless admin. tools on tap from AirMagnet

■ BY JOHN COX

SUNNYVALE, CALIF. — A start-up this week will introduce an application that combines several wireless LAN administration tools into an easy-to-use package that runs on any Microsoft Pocket PC-based handheld.

With AirMagnet's Handheld Analyzer, network administrators can walk through a wireless LAN, catalog all devices on it by network name, identify low-transmission rates and dead spots, and view a summary of security weaknesses for each device.

"For the first release of a diagnostic software package, it's very impressive," says Nathan Lemmon, senior technical adviser for wireless systems development at FedEx Corporate Services in Memphis, Tenn. "Someone knew what they were doing before they wrote any code."

There are three "someones": Dean Au, Chia-Chee Kuan and Miles Wu, AirMagnet's founders and top executives. Au and Wu founded Cinco Networks, which created NetXRay, said to be the first Windows 32-bit network analyzer. Cinco was bought by Network General, which used the software as the basis for its widely used Sniffer Pro Analyzer.

Last year, the trio saw a new opportunity: to create an application to run on a handheld, giving wireless LAN administrators a unique combination of tools, literally in the palm of their hands. Au says most software tools for wireless LANs today run only on laptops, are priced high and often don't take into account the unique elements of radio-based networks.

"Other vendors tend to confuse 'management' and 'security,'" says Jason Smolek, an analyst of enterprise networks at IDC. "Some vendors can offer centrally administered authentication and so on. But you're not actually managing the devices themselves. What is the access point doing? Is it being attacked? What kind of attack?"

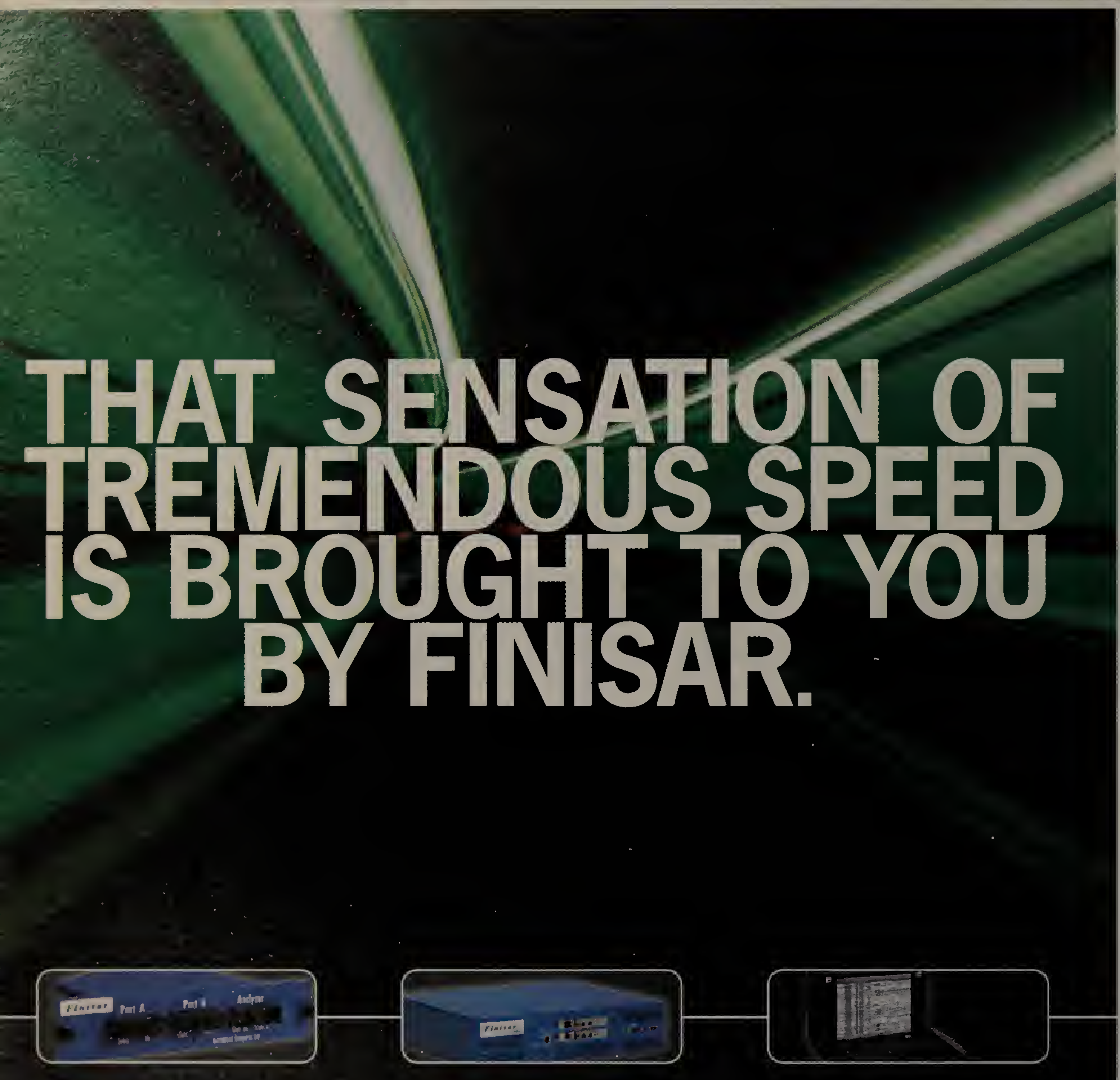
By answering these and other questions, AirMagnet "addresses an area that's underserved by products like HP OpenView or Tivoli," Smolek says. "Except for Wavelink, partnered with Symbol Technologies, there's no real testing and net monitoring [software]."

Handheld Analyzer costs $2,500, including an 802.11b interface card, in either PC Card or CF Type II card formats. In a demonstration at *Network World* offices, Au switched on a Compaq iPaq handheld, and the software collected data about a first-floor wireless LAN. Via bright, color screens, he found an authorized access point, several others with the Wired Equivalent Protection encryption turned off, and measured the signal of several access points.

A key part of the AirMagnet software is a patent-pending expert engine, which can analyze the data collected and display it clearly, and package it for use by other programs to analyze historical trends.

Lemmon says the software is ideal for campus wireless LANs and more mobile wireless LANs at sorting centers and aircraft loading ramps. "The device is very unobtrusive; you can see a quick snapshot of the entire [wireless] LAN; and you quickly find any dead spots," he says. "When you get a few hundred of these [wireless] LAN devices out there, it's not cost-effective to equip a tech-support group with Pentium IV laptops and separate spectrum analyzers."

AirMagnet: www.airmagnet.com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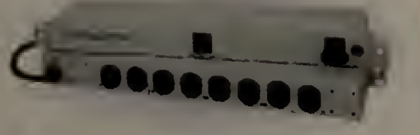

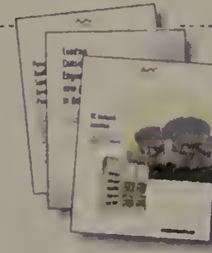

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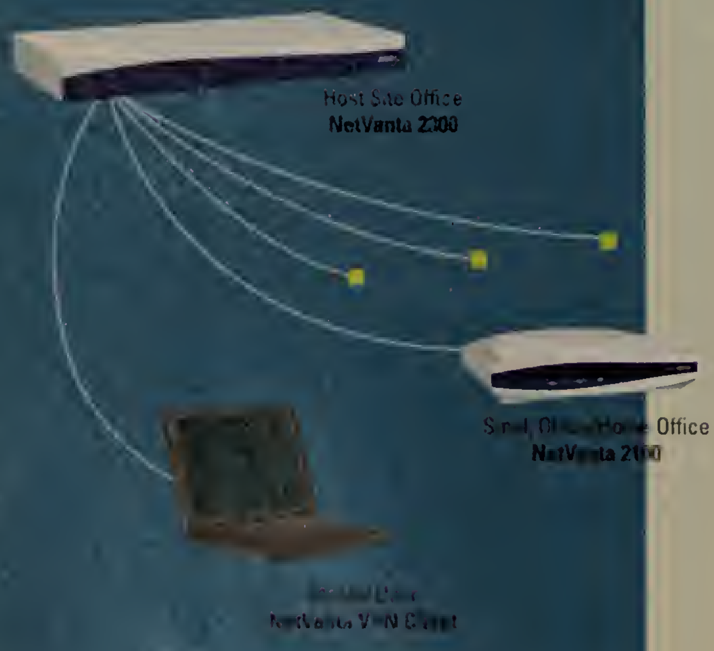

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Infrastructure

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Vendors tout simple-to-use VPN wares

Array Networks and TrueDisk exploit SSL for secure remote corporate access.

■ **BY TIM GREENE**

Users looking for Internet-based remote-access gear that is simpler to deploy and manage than IP Security VPN equipment soon will have two more options.

Array Networks and TrueDisk are introducing products designed to simplify remote access to corporate network resources by eliminating the need for special client software on remote machines and avoiding major reconfiguration of firewalls.

While Array's Security Proxy and TrueDisk's Extempo vary, both let users set up secure links over the Internet into corporate networks without adding software to the remote machines, eliminating the need to distribute and manage VPN clients. Both use the Secure Sockets Layer (SSL) security technology imbedded in Web browsers to establish encrypted connections for credit-card transactions on the Internet.

This strategy is simpler than the alternative of installing VPN client software on all remote machines in an IPSec remote-access VPN, says Zeus Kerravala, an analyst with The Yankee Group. It also is simpler to configure a firewall to accept SSL connections than it is to do the same with IPSec because of problems translating private IP addresses to public addresses, he says.

These SSL-based products are server-based and sit between corporate firewalls and corporate LANs where they establish SSL links with remote machines and then proxy between the remote devices and servers at corporate sites.

Array Networks, known for its Web traffic management gear, is announcing Array Security Proxy, software loaded on a dedicated hardware appliance. The proxy uses SSL not only to connect with remote users but also to encrypt traffic between itself and servers on a corporate network to guard against internal attacks.

The device can support 16,000 concurrent users. Netilla's new Enterprise Services Platform supports only 400 at a time (see graphic).

Array's Security Proxy makes it easier for customers to access corporate resources because they only need to be authorized centrally to access network resources from any machine that has a Web browser, says Sanjay Shirole, CEO of Xora in Mountain View, Calif. Xora plans to use the security proxy to guard transactions made over the Internet by Xora wireless gear, he says.

The security proxy appliance will be available May 15 for about $50,000.

Rather than making an appliance, TrueDisk makes software called Extempo that runs on a Windows NT, Sun Solaris or Linux server and makes SSL connections with

See VPN, page 22

Reaching out

Three companies have introduced new products for accessing corporate networks via Web browsers. Key features include:

Array Networks: Array Security Proxy
- Supports 16,000 concurrent users.
- Can initiate failover between boxes.
- Can cluster up to 32 devices.

Netilla: Enterprise Services Platform
- Supports 400 concurrent users.
- Load balances traffic.
- Firewalls LAN traffic.

TrueDisk: Extempo secure extranet
- Software runs on Windows NT, Solaris, Linux.
- Supports handhelds, PCs, phones with browsers.
- User defines access to files.

Short Takes

■ **SMC Networks** last week announced three Gigabit Ethernet network interface cards aimed at high-end desktops and servers. Two SMC NICs could be used to connect desktops at 10/100/1000M bit/sec over Category 5 copper cabling, letting users bring a LAN up to Gigabit Ethernet without rewiring a facility with fiber-optic cable. The **SMC-9562SX** is a server-focused Gigabit Ethernet NIC that has a 1000Base-SX interface for customers with single-mode fiber backbones. The **SMC-9552TX** and **SMC9562TX** are copper-based 10/100/1000M bit/sec NICs aimed at desktop Gigabit and server deployments, respectively. Both NICs can autosense connections from 10M bit/sec to Gigabit, and support IP checksum offloading and Jumbo Frames, both which can help improve server and workstation performance when transmitting large amounts of data. The 32-bit, copper-based SMC-9552TX is available for $66, while the 64-bit version is available for $108. The fiber-based SMC9562SX will be available in June for $300. **www.smc.com**

Multifunction switch on tap from Inkra

■ **BY JENNIFER MEARS**

Start-up Inkra Networks this month will join the list of vendors rolling out multifunction devices that consolidate data-center management in one box.

The company's Inkra 4000 and Inkra 1500 Virtual Service Switches will sit between a router and application servers to integrate and — after adding hardware and software — support myriad IP functions, such as firewalls, VPNs, load balancing and Web acceleration within a single box.

Keys to the Inkra switches are its Virtual Rack processors and software that can allocate bandwidth, buffers and memory to applications as needed. Virtual Rack also features another technology called Hardwall that lets users create secure, logical partitions between applications to ensure security.

With these Inkra boxes customers won't have to install and maintain individual hardware devices to support their range of resources.

While many of Inkra's beta customers are service providers, such as RackSpace, Savvis Communications and Cable & Wireless, at least one enterprise firm is considering the technology. Lance Braunstein, executive director of technical operations at Morgan Stanley Online, says his firm is reviewing the Inkra products as a way to reduce the infrastructure support necessary to offer different online services to different classes of customers.

"I could go out and configure a load balancer for my silver clients, a load balancer for my gold clients, and a load balancer for my platinum clients, and do the same thing with a firewall for each, for intrusion detection for each, for [Secure Sockets Layer] for each. But you can see that would become expensive," he says. "What Inkra does is say, 'OK, we're going to put all these [functions] within the appliance and give you the ability in that appliance to segment your clients."

PROFILE: INKRA

Location: Vancouver

Founded: May 2000

Business: Virtual service switch.

Financing: $36.5 million from Battery Ventures, Norwest Venture Partners, Storm Ventures and Greenstone Venture Partners.

Competitors: Array Networks, Nauticus.

Fun fact: Free beer sessions with customers lets Inkra keep close tabs on market news.

Inkra, co-founded by Dave Roberts, a former Nortel executive, and Sanjay Dhawan, who most recently was vice president of business development at broadband equipment maker Netopia, is not alone in addressing the proliferation of devices within enterprise data centers; others, such as Nauticus Networks, Crossbeam Systems and Array Networks, have introduced similar products.

Inkra 4000, designed for service providers and large firms, has a 14-slot chassis and supports up to 160G bit/sec of switching throughput. The box supports four- or eight-port Gigabit Ethernet modules, or a 32-port Fast Ethernet module. Inkra 4000 starts at $98,000 and will be available this quarter.

The Inkra 1500 supports four Gigabit Ethernet ports and has a 20G bit/sec switch fabric. It starts at $25,000 and will be available in the third quarter.

Inkra: www.inkra.com

TOLLY ON TECHNOLOGY

Kevin Tolly

Campus wireless poses bandwidth mgmt. dilemma

Ever since the mid-1990s when switched and Fast Ethernet started to appear on campus networks, we've witnessed a bandwidth boom the likes of which we'd not seen before. This bandwidth glut played a significant role in suppressing interest in implementing LAN-based quality-of-service schemes. In a somewhat bizarre twist, though, the move to wireless may well cause this situation to reverse itself.

For all that wireless brings — and I'm a strong proponent of it — it is not a panacea. Like most technologies, there are trade-offs. Gone is the world where your desktop or notebook commands a dedicated 100M bit/sec connection to a LAN switch that, by the way, can offer similar connectivity to dozens if not hundreds of your colleagues.

In its place is the access point. Linked "upstream" to a single switch port via Fast Ethernet, it becomes the "hub" (figuratively and literally) of your wireless LAN. And, if you are thinking hub as in the old-fashioned 10M bit/sec Ethernet hubs that used to be bottlenecks in your network — you've got a good handle on the situation.

While not identical, the comparison works well. With wireless, you and your neighbors must share a very limited amount of bandwidth. Given that virtually all of the wireless that is installed today is based on the 802.11b standard — that "pool" of bandwidth is but 11M bit/sec.

Thus, we find ourselves in much the same situation we were in during the preswitching, pre-Fast Ethernet age — only worse. With today's faster PCs, streaming applications and monster PowerPoint files, a single application could consume every bit of that bandwidth.

Network executives need to do something — but what? Ironically, most of the fancy QoS we've got built into our LAN switches won't help us much. Those switches typically implement class-based queuing. This sorts individual packets into different priority queues but doesn't kick in until the LAN port is saturated — something that is never going to happen when an access point that has an 11M bit/sec downstream capacity is wired into a Fast Ethernet switch port.

Enter the "bandwidth manager." Long used at the edge of the campus, where the Fast Ethernet/Gigabit Ethernet superhighway typically becomes a T-1 country road, bandwidth-management products excel at doling out precious bits of bandwidth.

Unlike the typical LAN switch, most bandwidth managers implement flow-based queuing algorithms. This lets them exercise precise control over the session traffic that traverses the bandwidth manager. Because most are sensitive to application-level characteristics, one can easily configure them to put a governor on, say, FTP or HTTP download streams. Some are sophisticated enough to allow "full throttle" when there are no other stations vying for the bandwidth.

So it would seem that a bandwidth manager is in order. But, as always, there are trade-offs.

For starters, bandwidth-management devices are not free. While typically easy to manage, the added cost will affect your capital budget.

The biggest concern will be with network design. Today, many network managers simply plug in wireless segments where needed. Given that every one of those segments needs to traverse the bandwidth manager, this presents a problem. There's no way you'd want to buy a dedicated box for each segment.

So some network redesign might be required — at least until true bandwidth management gets bundled inside access points.

Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Manasquan, N.J. He can be reached at ktolly@tolly.com.

Enterasys users sit tight amid vendor's turmoil

■ **BY PHIL HOCHMUTH**

PORTSMOUTH, N.H. — While a recent leadership shakeup and job cuts at Enterasys Networks have made some investors and industry watchers wince, customers of the embattled network company say they are not ready to man the life boats — at least for now.

During the last several weeks, Enterasys replaced its CEO and two top executives, and reduced its workforce by 30%, or about 1,700 employees. The shakeup came as Enterasys warned investors of a revenue shortfall for the first quarter of 2002 and for the fourth quarter of 2001. The company says its revenue will be down approximately $35 million and $70 million, for the fourth quarter and first quarter, respectively.

Enterasys delayed its fourth-quarter earnings release because of an internal financial review being conducted by KPMG. The internal audit came after the company in February found discrepancies between different contracts related to the same $4 million account within its Asia-Pacific region. At the same time the contract issue was discovered, Enterasys said the U.S. Securities and Exchange Commission (SEC) was investigating Enterasys and certain affiliated companies. Then-CEO Henry Fiallo said the SEC probe was "apparently unrelated" to the Asia-Pacific contract issue.

The 1,700 job cuts at Enterasys so far have not affected St. John's Hospital, a large Cabletron and Enterasys customer in Springfield, Ill.

"We've been pretty fortunate in that we've been able to keep the same salesperson," says James Labonte, network engineer at St. John's. "The support staff we work with in the Midwest only lost one person, so there's been no drop-off there."

As for the future viability of the vendor, Labonte says his organization is not yet in a panic.

"We're not ready to jump ship," Labonte says. "We're hoping they pull through this because we've had some plans in the works for some time," to roll out new Enterasys equipment.

St. John's recently upgraded some of its old Cabletron products with Enterasys gear and added policy-based switching with Enterasys' User Personalized Network software.

"It would be easier and cheaper to accomplish our goals if we stayed with Enterasys instead of having to do a forklift replacement with a Cisco," or other network vendors, Labonte says.

Enterasys is not the only large network vendor to shake up its customer base with financial problems and layoff news. Enterprise network vendors 3Com and Avaya earlier this year announced staff reductions, and Nortel cut jobs and reorganized itself in October.

Poor market performance has plagued the network equipment industry as of late. According to the Dow Jones Communications Technology Index — a stock index which includes companies such as Enterasys, 3Com, Cisco, Avaya, Nortel, Extreme Networks and Foundry Networks, among others — is listed as the third-worst-performing Dow Jones industry index during the last three months.

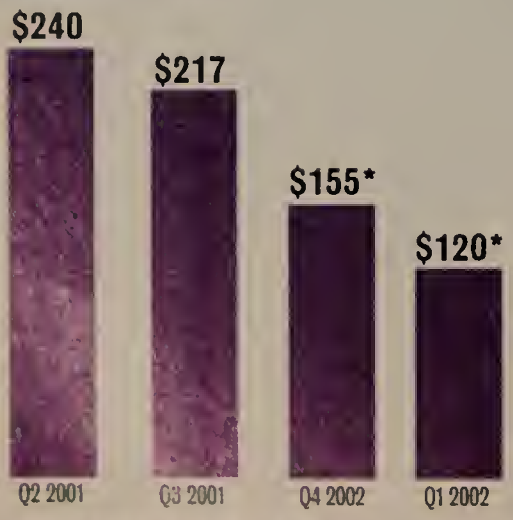
The wait-and-see approach with Enterasys is also being taken at Bridgewater State College in Bridgewater, Mass., where a network upgrade recently was completed with Enterasys X-Pedition Gigabit Ethernet switches.

"We analyze the financial situation of any of our vendors when submitting a [request for proposal]," and take that into account, says Bill Davis, the college's CIO. "We're not doing any major rollouts at the moment, so we can sit tight a little while. When we start making purchasing decisions in a few months for the next fiscal year, we'll have to consider," Enterasys' financial health. "We've been very pleased with Enterasys' products," he adds. ■

Slippery slope

Enterasys recently saw a management shakeup and layoffs as the company's revenues continue to slide.

Enterasys revenue (in millions)



*Revenue estimates, not yet reported.

SOURCE: ENTERASYS

VPN,
continued from page 21

remote users via their Web browsers. When users authenticate to Extempo, they see a Web page of files they are authorized to access. They select the one they want, and Extempo proxies between the machine that has the file and the remote machine.

If remote users add another piece of software called ExtempoPublisher to their PCs or a server, they can authorize other users to share particular files. For example, if a user creates a marketing document, ExtempoPublisher tells the Extempo server to authorize the entire marketing department to view it. The next time marketing department members log on to Extempo, that file will appear on the list of files they are authorized to see.

Extempo is available now and costs $3,000 for software that supports 10 users, and otherwise costs $200 per user. A 30-day free trial is also available.

Meanwhile, Netilla is introducing at NetWorld+Interop 2002 in Las Vegas next month a jacked-up version of its Service Platform called Enterprise Services Platform. The new appliance can handle 400 users at the same time, a jump from 50 on its previous appliance. It costs $300 per user.

The new device adds to its existing firewall the capability to filter traffic from the LAN as well as from the Internet to protect from internal intrusions. ■

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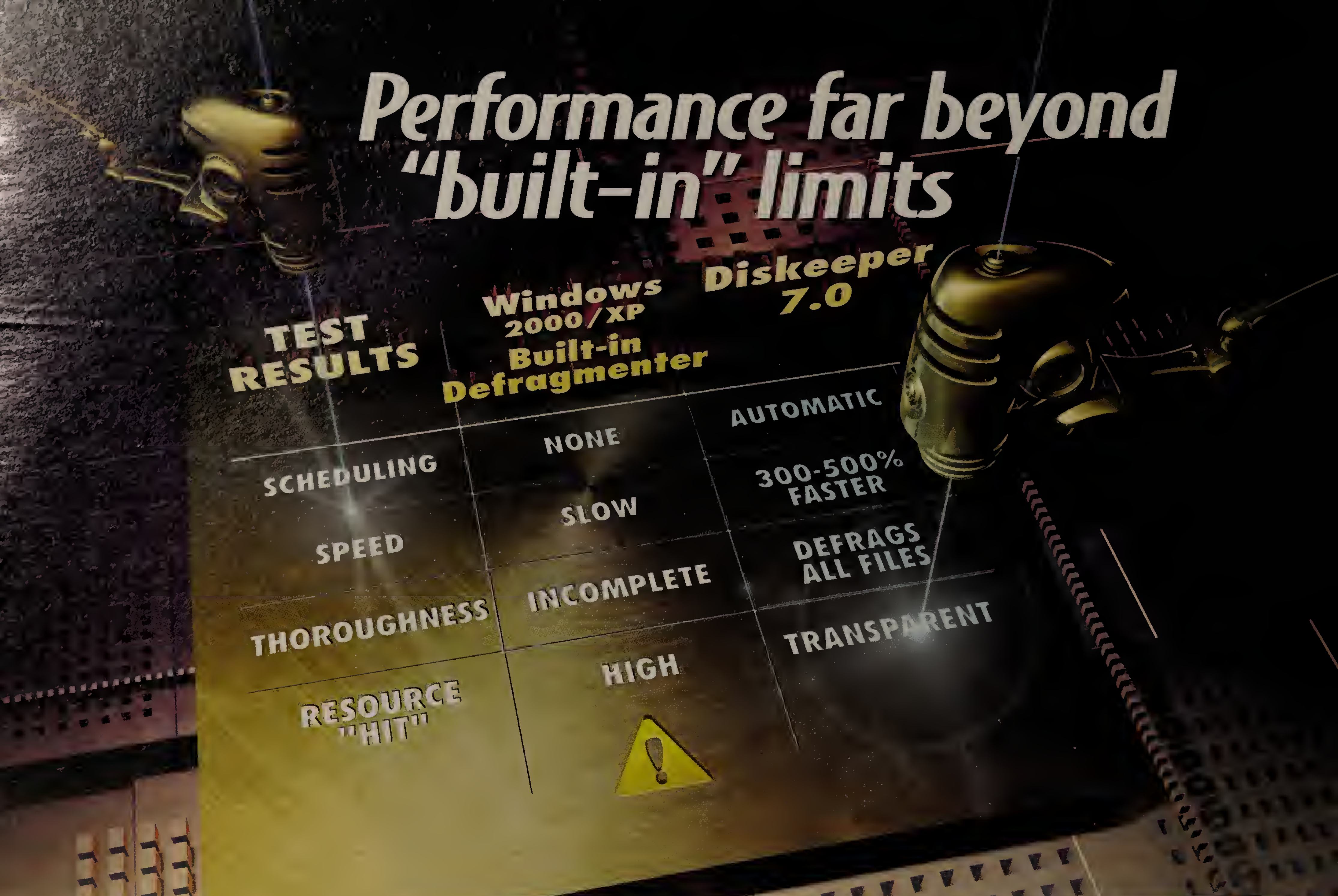

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☐ Check here if you DO NOT wish to receive this Information.

If there is a parent company, please provide name:
☐ My home address is also my business address.
Optional delivery address: Enter your home address below if your company will not accept delivery at your business address:

Street Address
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B402

1. What is the principal business activity at your location?
(check ONE only)

01.☐ Manufacturing (Non-Computer/ Communications OEM)
02.☐ Finance/Banking
03.☐ Insurance/Real Estate/Legal
04.☐ Health Care Services
05.☐ Hospitality/Entertainment/ Recreation
06.☐ Media/TV/Cable/Radio/Print
07.☐ Retail/Wholesale Trade/Business Services
08.☐ Transportation
09.☐ Utilities/Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
10.☐ Government/Military
11.☐ Consulting (Independent) *
12.☐ Education
13.☐ Carriers/Voice/Data/ISP
14.☐ Web Hosting/HSP
15.☐ ASP/SSP/MSP
16.☐ Manufacturing (Computer/ Communications/OEM)
17.☐ Resellers/VARs/VADs/ Integrators/Distributors* (Computers/Communications)
18.☐ Other (please specify) ____________

*Attn Consultants, Integrators, Distributors, Resellers: Please complete form based on ALL clients and your own business needs

2. P: What is your primary job function? (check ONE only) S: What additional job functions are you involved in? (check ALL that apply)

P S
☐ 1. ☐ Network Management
☐ 2. ☐ CIO/CTO/IS/IT/MIS/ Systems Management
☐ 3. ☐ LAN Management
☐ 4. ☐ Datacom/Telecom Management
☐ 5. ☐ Internet/Intranet/Web/ E-Commerce Management
☐ 6. ☐ Engineering Management
☐ 7. ☐ Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.)
☐ 8. ☐ Consultant (Independent)
☐ 9. ☐ Other (please specify) ____________

3. What is the estimated value of network equipment and services that you specify, recommend, or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–O.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainframes/Minis)*
B ____ Desktops *(Micros/Laptops/ Workstations)*
C ____ Mobile *(including PDAs, Wireless)*
D ____ Servers
E ____ LANs
F ____ WAN Equipment
G ____ Carrier Services
H ____ Internet/Web/E-commerce
I ____ Intranet/Extranet
J ____ Internetworking *(including Routers, Switches)*
K ____ Storage
L ____ Remote Access
M ____ Peripherals
N ____ Software
O ____ Service/Support Services

4. What is the total number of sites for which you have purchase influence?
(check ONE only)

1. ☐ 100+ 2. ☐ 50 to 99 3. ☐ 20 to 49 4. ☐ 10 to 19 5. ☐ 2 to 9 6. ☐ 1 7. ☐ None

8. Please indicate the Web/Security/LAN/Internetworking/Wireless/Mobile/WAN Equipment/ Carrier Services that you are currently involved in purchasing or plan to purchase:
(check ALL that apply) **A. Currently involved in purchasing** **B. Plan to purchase**

WEB
A B
☐ 01. ☐ Web Servers/Software
☐ 02. ☐ Web Traffic Management
☐ 03. ☐ Electronic Commerce Tools
☐ 04. ☐ Web Development Tools
☐ 05. ☐ Web Content Management
☐ 06. ☐ Web Collaboration/ Groupware
☐ 07. ☐ Web Acceleration/Caching/ Load Balancing
☐ 08. ☐ Web Hosting Services
☐ 09. ☐ Other

SECURITY
A B
☐ 10. ☐ Firewalls
☐ 11. ☐ Anti-Virus Software
☐ 12. ☐ Private Key Encryption Tools
☐ 13. ☐ DES Encryption Tools
☐ 14. ☐ Authentication Tools
☐ 15. ☐ Intrusion Detection
☐ 16. ☐ Certificate Authorities
☐ 17. ☐ Biometrics
☐ 18. ☐ Other

LANs/INTERNETWORKING
A B
☐ 19. ☐ Fast Ethernet
☐ 20. ☐ Gigabit Ethernet
☐ 21. ☐ Layer 3-7 Switches
☐ 22. ☐ ATM Switches
☐ 23. ☐ Routers
☐ 24. ☐ Network Attached Storage (NAS)
☐ 25. ☐ Storage Area Networks (SANs)
☐ 26. ☐ Storage Backup (Optical, Disk, Tape, RAID)
☐ 27. ☐ Network Test/Diagnostic Tools
☐ 28. ☐ Uninterruptable Power Supplies (UPS)
☐ 29. ☐ Network Interface Cards (NICs, PCMCIA)
☐ 30. ☐ Hubs/Intelligent Hubs/ Stackable Hubs
☐ 31. ☐ Cables,Connectors, Baluns
☐ 32. ☐ Wiring/Fiber Systems
☐ 33. ☐ Net Management Systems
☐ 34. ☐ Voice Over IP (VoIP) Tools
☐ 35. ☐ Network Analyzers
☐ 36. ☐ Other Local-Area Network/ Internetworking

WIRELESS/MOBILE
A B
☐ 37. ☐ Wireless LANS
☐ 38. ☐ Wireless/Cell Phones
☐ 39. ☐ Wireless LAN Extension Tools
☐ 40. ☐ Mobile Data Equipment/Services
☐ 41. ☐ PDAs
☐ 42. ☐ Other Remote/Wireless

WAN EQUIPMENT
A B
☐ 43. ☐ Frame Relay Equipment
☐ 44. ☐ Bandwidth Managers
☐ 45. ☐ Bandwidth Shaping/QOS Tools
☐ 46. ☐ VPN Equipment
☐ 47. ☐ ATM Switches
☐ 48. ☐ Voice/Video over IP Gateways
☐ 49. ☐ Modems
☐ 50. ☐ Cable Modems
☐ 51. ☐ xDSL Products
☐ 52. ☐ Diagnostic/Test Equipment
☐ 53. ☐ DSUs/CSUs
☐ 54. ☐ PBXs
☐ 55. ☐ Call Center Tools
☐ 56. ☐ Videoconferencing Gear
☐ 57. ☐ ISDN Equipment/Services
☐ 58. ☐ Other WAN Equipment/Services

CARRIER SERVICES
A B
☐ 59. ☐ Internet Access
☐ 60. ☐ Private Lines
☐ 61. ☐ Frame Relay Services
☐ 62. ☐ ADSL/DSL
☐ 63. ☐ T-1/T-3 Services
☐ 64. ☐ ATM Services
☐ 65. ☐ Managed Services
☐ 66. ☐ VPN Services
☐ 67. ☐ LAN-Extension Services
☐ 68. ☐ OC-3/OC-12
☐ 69. ☐ Wavelength Services
☐ 70. ☐ Dark Fiber
☐ 71. ☐ Other Carrier Services

None of the above (1 – 71) A ☐ 72. B ☐

9. Please indicate the Systems/Peripherals/Software/Applications/Business Services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)
A. Currently involved in purchasing **B. Plan to purchase**

SYSTEMS/PERIPHERALS
A B
☐ 01. ☐ Laptops/Notebooks
☐ 02. ☐ Desktops
☐ 03. ☐ Intel-Based Servers
☐ 04. ☐ Risc-Based Servers
☐ 05. ☐ Print Servers
☐ 06. ☐ Fax Servers
☐ 07. ☐ Remote Access Servers
☐ 08. ☐ Video Servers
☐ 09. ☐ Mid-Range Systems (including workstations)
☐ 10. ☐ Mainframes
☐ 11. ☐ Printers
☐ 12. ☐ Enclosures/Racks/Furniture
☐ 13. ☐ Other Computers/ Peripherals

SOFTWARE/APPLICATIONS
A B
☐ 14. ☐ Desktop/Server Operating Systems
☐ 15. ☐ Network Management
☐ 16. ☐ Systems Management
☐ 17. ☐ Directory Services
☐ 18. ☐ E-Mail
☐ 19. ☐ Groupware
☐ 20. ☐ Database Management Systems
☐ 21. ☐ Customer Resource Management (CRM)
☐ 22. ☐ Enterprise Resource Planning (ERP)
☐ 23. ☐ XML Tools
☐ 24. ☐ Desktop Videoconferencing
☐ 25. ☐ Middleware
☐ 26. ☐ Document Management Tools
☐ 27. ☐ Site Metering Tools
☐ 28. ☐ Software Distribution Tools
☐ 29. ☐ Data Warehousing
☐ 30. ☐ Applications Development Tools
☐ 31. ☐ Other Software/Applications

BUSINESS SERVICES
A B
☐ 32. ☐ Application Service Provider Services
☐ 33. ☐ Systems Integration/ Consulting
☐ 34. ☐ Education/Training Services
☐ 35. ☐ Other Services

None of the above (1 – 35) A ☐ 36. B ☐

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)
A. Currently installed **B. Planned for purchase**

NETWORK PROTOCOLS
A B
☐ 01. ☐ TCP/IP v4
☐ 02. ☐ TCP/IP v6
☐ 03. ☐ SNA/APPC/APPN/LU6.2
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ NETBIOS/NETBUEI
☐ 06. ☐ NFS
☐ 07. ☐ Other Network Protocols

LAN/WAN ENVIRONMENT
A B
☐ 08. ☐ Gigabit Ethernet
☐ 09. ☐ Switched Ethernet
☐ 10. ☐ Fast Ethernet
☐ 11. ☐ Ethernet
☐ 12. ☐ ATM
☐ 13. ☐ Token Ring/Token Ring Switching
☐ 14. ☐ Layer 3-7 Switching
☐ 15. ☐ FDDI
☐ 16. ☐ Fibre Channel
☐ 17. ☐ Wireless LANs
☐ 18. ☐ DSL
☐ 19. ☐ ISDN
☐ 20. ☐ Frame Relay
☐ 21. ☐ Private Line T1, T3, OC-3, OC-12
☐ 22. ☐ Other LAN/WAN Environment

DESKTOP/SERVER OPERATING SYSTEMS
A B
☐ 23. ☐ Windows 2000
☐ 24. ☐ Windows 95/98
☐ 25. ☐ Windows NT/Windows 2000
☐ 26. ☐ Novell (NetWare 5.X, 4.X, 3.X, 2.X)
☐ 27. ☐ LINUX
☐ 28. ☐ Intel based UNIX
☐ 29. ☐ RISC based UNIX (incl. SOLARIS)
☐ 30. ☐ IBM MVS/VM/VSE/ESA
☐ 31. ☐ OS/400
☐ 32. ☐ Digital VMS
☐ 33. ☐ Macintosh
☐ 34. ☐ Palm OS
☐ 35. ☐ Windows CE
☐ 36. ☐ Other Network Operating System

None of the above (1– 36) A ☐ 37. B ☐

Continued on next page...

Continued from page one...

5. What is the total number of Servers/Clients installed/planned at your location/in your entire organization? (check ONE box in each column)

SERVERS At Location A		SERVERS Entire Org. B	CLIENTS At Location C		CLIENTS Entire Org. D
☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only)

CORPORATE/ENTERPRISE:

1. ☐ Entire Enterprise/ Multiple Enterprises
2. ☐ Multinational Enterprise
3. ☐ Division/Multiple Divisions
4. ☐ Department
5. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

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7. What is the estimated number of employees in your entire organization/at your location? (check ONE in each section)

A. Entire organization:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

B. At your location:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

11. Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Servers

1. ☐ IBM (Mainframes)
2. ☐ IBM RS/6000
3. ☐ IBM AS/400
4. ☐ Compaq/Digital/ Tandem
5. ☐ Unisys
6. ☐ H-P
7. ☐ Other

B - Workstations/Desktops/Laptops

1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Compaq/Digital
4. ☐ IBM
5. ☐ Dell
6. ☐ Gateway
7. ☐ Fujitsu
8. ☐ Other

12. What is the estimated gross revenue of your entire company/institution? (check ONE only)

1. ☐ $20 Billion or More
2. ☐ $10 Billion to $19.9 Billion
3. ☐ $1 Billion to $9.9 Billion
4. ☐ $500 Million to $999.9 Million
5. ☐ $100 Million to $499.9 Million
6. ☐ $50 Million to $99.9 Million
7. ☐ $10 Million to $49.9 Million
8. ☐ $5 Million to $9.9 Million
9. ☐ $4.9 Million or Less
10. ☐ None of the above

13. For which areas outside of the U.S.A. do you have purchase influence? (check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ Africa
7. ☐ Canada
8. ☐ None

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Short Takes

■ **Macromedia** unveils this week a complete refresh of its Web design and development tools. The Macromedia MX product line now includes ColdFusion MX for server-side scripting; Dreamweaver MX for Web application development; Flash MX for multimedia design; Fireworks MX for interactive graphics; and FreeHand 10 for storyboarding Web sites. Among the new features are better integration between the individual tools, enhanced support for Sun's Java 2 Platform Enterprise Edition and Microsoft's .Net platforms, and improved accessibility features that make it easier to design content for and by people with disabilities. The upgraded product line will ship next month. Pricing for the full bundle is $800. Early users include Mercedes-Benz Canada and Webvertising.
www.macromedia.com

■ **Symantec** will unveil three new models of its VelociRaptor firewall appliance line early next month, adding better performance and scalability, and expanded protocol proxies to the devices. The firewalls will sport new support for redundant configurations to ensure high availability and load balancing, along with better performance and scalability. The three models will each have four 10/100 Ethernet ports and will add proxies for protocols such as H.323 and Real Time Streaming Protocol used in Web conferencing. The firewalls are targeted at offices that have between 30 and 10,000 systems to protect, and offer up to 100M bit/sec of throughput, the company says. The low-end VelociRaptor 1100 is designed for networks of up to 100 nodes, offers 60M bit/sec of throughput and will cost $4,995. The 1200 supports up to 250 nodes, can handle up to 100M bit/sec of traffic and will cost $10,000. The high-end VelociRaptor 1300 has no limit to the number of devices it can protect, performs at 100M bit/sec and will cost $15,000.
www.symantec.com

Switch tackles XML traffic

■ **BY ANN BEDNARZ**

NETWORLD +INTEROP

CHICAGO — Sarvega, which means "universal" in Sanskrit, next month is unveiling its debut product — a switch that the start-up says will ease translation, encryption and priority-based routing of XML traffic.

Slated for launch at NetWorld+Interop 2002 Las Vegas, Sarvega's XML switch is designed to handle XML traffic, offloading that processing from servers. The switch includes content-based routing features, which lets users set priorities on important transmissions. So for example, a financial services firm might choose to configure the switch to provide better quality of service for trade orders than for customer address changes. The device also can encrypt or unencrypt messages, depending on the level of security required.

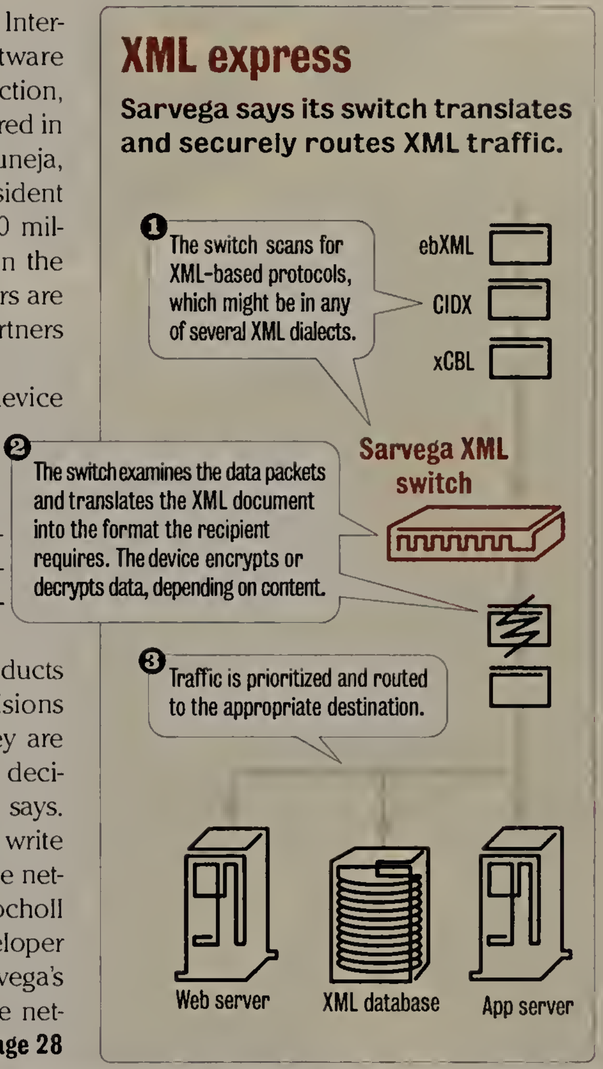
The device is aimed at large companies that are faced with growing levels of XML traffic as vendors in areas such as enterprise application integration and e-procurement shift from proprietary data formats to XML, says John Chirapurath, a Sarvega co-founder and vice president.

Chirapurath co-founded Sarvega in June 2000 with CEO Sunil Gaitonde, a Cisco veteran who founded Internet gateway software maker Internet Junction, which Cisco acquired in 1995; and Girish Juneja, Sarvega's vice president of engineering. Sarvega closed a $10 million first round of venture funding in the fourth quarter of 2001; its key investors are Bessemer Venture Partners, KB Partners and ComVentures.

The idea of a dedicated network device for routing XML traffic appeals to Bill Rocholl, who is first vice president at ABN Amro's services division and is responsible for the financial institution's North American network environment for commercial and consumer client business.

ABN Amro has load-balancing products that make application-level decisions based on packet inspection, but they are not geared for making packet-level decisions about XML content, Rocholl says. Alternatively, software developers can write code to handle XML routing, but if the network grows or something changes, Rocholl doesn't want to have to bring a developer back in to make code changes. Sarvega's XML switch "could put control of the net-

See Sarvega, page 28


XML express

Sarvega says its switch translates and securely routes XML traffic.

❶ The switch scans for XML-based protocols, which might be in any of several XML dialects.
ebXML
CIDX
xCBL
Sarvega XML switch
❷ The switch examines the data packets and translates the XML document into the format the recipient requires. The device encrypts or decrypts data, depending on content.
❸ Traffic is prioritized and routed to the appropriate destination.
Web server
XML database
App server

Notes users gain migration options

■ **BY JOHN FONTANA**

The ripple effect of IBM's decision to move Lotus Notes and Domino to a Java platform has produced yet another offering that claims to give IT executives an alternative to Big Blue's plans.

Start-up ToJava last week introduced itself and unveiled a set of tools by the same name for cloning Notes applications so they can run on a Java 2 platform Enterprise Edition (J2EE) platform. ToJava supports Lotus customers giving in to IBM's move to Java, but it gives them the option of thumbing their nose at IBM's WebSphere and picking any J2EE platform. The ToJava tools also include the ToJava Engine, which provides connectivity to the Notes Storage Facility (NSF) while data is being migrated to a relational database back end.

"ToJava gives you the functionality that Notes gives you," says Hersel Ahdout, senior developer and system designer for GoProjex, which develops a project management application called GoProject/CRE to manage real estate projects for corporations. "It takes the contents of Notes forms and builds Java Beans." Ahdout says the ToJava tools can shave 60% to 70% off the development time it takes to convert Notes applications to Java.

"We decided we were going to switch our application to the Java platform, and ToJava makes sense for our purposes. It also means we don't have to wait for IBM to come up with a migration plan," he says.

ToJava joins two other projects designed to give Notes users some alternatives. The first is an open source project called Crimson that is led by the Notes Open Source Software Organization. Crimson is designed to replace the Java Server Pages (JSP) engine IBM yanked from Lotus Domino R6, set to ship later this year.

Also, a company called Jagre has developed a tool called Jasper that works with the Domino Designer application development environment and lets JSPs be added to Notes databases. Once added, the JSPs can be replicated throughout a Notes network, another feature that IBM yanked from the forthcoming release of Notes.

But while those two efforts are for keeping users on Domino, ToJava is offering a migration path off the platform.

ToJava has a Java-based library that contains objects for fields, forms and views, constructs that are familiar to Notes developers. It also includes a set of JSP tag libraries for building Domino-like front ends. It has a middleware library that contains Notes-like APIs. ToJava also clones Notes security, offering document-level and roles-based security.

The ToJava Engine server is middleware to connect a Notes database to applications running on a J2EE server.

"The engine helps in migrations because

See Domino, page 28

17
TELLER
18
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'NET INSIDER

Scott Bradner

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It is quite hard to figure out just what the U.S. Copyright Office thinks it's doing. On the surface, it looks like the office has capitulated to the greed-before-thinking copyright industry. But there may be more than meets the eye.

I'm sitting in my home office writing this on the morning of April 21 with some very good gospel music playing in the background. The music is coming from the Sunday morning gospel music show on the Plano, Texas country music radio station KHYI. I listen to KHYI a lot over the Web (www.hkyi.com) — in my home office, but also at work.

But I may not be able to a month from now.

As yet another result of the Digital Millennium Copyright Act (perhaps called that because it will take a millennium to work out all the effects of the DMCA), Internet radio stations will soon have to pay royalty fees on the material they stream to listeners.

The U.S. Copyright Office (www.loc.gov/copyright), as the DMCA required, has put together a set of proposed royalty fees. On the surface, the proposed fees make no sense whatsoever, but maybe whoever it was that influenced the office has a logical plan. The office was clearly not influenced by the general U.S. population — you know, the folks that governments are supposed to protect.

It's clear to me that artists should get paid for their work, even when it is being streamed over the Internet. So I don't have an issue with some set of fees. The problem here is the level of the fees and the blindness to the business reality of Internet radio. The proposed fees work out to 14 cents per song, per 100 listeners for Web-only broadcasters and half that for stations, like KHYI, which stream its regular over-the-air shows.

Because I have KHYI streaming at home and at the office all the time (whether I'm there or not), having me as a listener would cost KHYI at least $200 per year ($.0007 x 15 (songs per hour) x 24 hours x 365 days x 2 + a 9% ephemeral fee). I am far from sure that KHYI's advertisers will be willing to pay enough to cover that fee because there is little chance that they could get me to buy enough stuff to make it worthwhile. The problem is far worse for small Internet-only stations, of which there are thousands — the proposed fees are far higher than their total budgets.

The only explanation I can come up with for the fees being so high and for being blind to the stations' budgets is that someone has been blinded by the lure of subscription-only services (which have never succeeded) and wants to be sure there is no competition. It is sad when the government becomes the mugging weapon used to kill something good.

Disclaimer: Conspiracy theories abound at Harvard, but I came up with this on my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

Semio revs up categorization engine

BY JENNIFER MEARS

SAN MATEO, CALIF. — Knowledge management software vendor Semio last week unveiled the latest version of its content categorization and indexing engine designed to help customers better handle the thousands of digital documents they are dealing with these days.

Based on a new architecture that supports multiple servers running the categorization software, Semio now can process and index millions of documents at a time, the company says. Semio Tagger 5.0 also includes predefined classifications for specific business functions such as human resources and sales and marketing so companies can get information indexed more quickly. Semio also has created templates for vertical industries such as government and healthcare.

Semio takes content from a variety of sources, including Web sites, databases and content management systems, extracts key concepts from them and then categorizes them in a Yahoo-like format with directories and subdirectories. Semio can create the categories automatically, or business can customize how they want information classified, says Josh Mugele, director of product marketing at Semio.

Because Semio's Tagger engine uses XML-based tags, the categorized content can be stored in databases and other content-management repositories. Companies don't have to use the Semio browser-based user interface called Semio Skyline, and, in fact, Semio partners with portal vendors such as Epicentric, Info-Image and Plumtree to provide search capabilities within their products (www.nwfusion.com, DocFinder: 9127).

Highwire Press, an online resource of more than 320 scientific journals at Stanford University, uses Semio to help place documents in categories it has created, but uses its own Web site to present the information to the user.

"There are two very different challenges: One is coming up with a taxonomy, and the other is coming up with software that figures out what documents go where in the taxonomy," says John Sack, director of Highwire Press. "We did the former, and Semio did the latter."

Sack says he is particularly happy about a new feature in Semio Tagger 5.0 that lets users add documents to the classification engine as they are received, rather than having to do batch jobs.

"We get about 2,000 new documents a day and a really important aspect for us of the new technology is the incremental indexing, the ability to continuously add new documents to a growing collection without having to recategorize all of them," he says.

Semio Tagger 5.0 is available now, priced according to the number of seats, although an average license costs about $100,000, a spokeswoman says. ■

Sarvega

continued from page 25

working portion of it into the hands of people who understand and are responsible for the service delivery topology," he says.

Forrester Research analyst David Truog says hardware for handling XML traffic is timely. "Companies increasingly exchange data among applications using Internet standards — especially XML," Truog said in a research brief published last month. "As this traffic on private networks and the Internet balloons, large companies will need to intelligently process XML messages in the network at wire speed — not just in general-purpose servers."

Sarvega's switch sits on a LAN and scans for XML-based protocols. Incoming packets might be composed in any of several XML variants — there are multiple dialects that exist today, such as ebXML for general e-business transactions and CIDX for the chemical industry. If necessary, the switch translates the XML document into the format that the recipient requires.

Rocholl says XML translation capabilities could be helpful at ABN Amro, which uses standards-based Document Type Definitions to define the structure of information stored in applications. But definitions and schema vary with off-the-shelf XML products, requiring developers to write a translator for these variations. The Sarvega switch could take on translation tasks, Rocholl says.

Rocholl and his team have reviewed Sarvega's technology and were in contact with the vendor during XML switch development. The next step in ABN Amro's evaluation process is a limited pilot test, which Rocholl plans to conduct over the next few months.

If ABN Amro decides to deploy the Sarvega switch, it will coexist with other single-purpose devices that handle caching, Secure Sockets Layer termination and load balancing, for example. Whenever practical, the firm has migrated from software-based network products to dedicated hardware appliances, Rocholl says. "These have simplified our life, and we want to continue that evolutionary process," he says. "We think this [XML switch] might be the next way to do that."

Sarvega's XML switch is a 4U (7 inches) high; the company expects to shrink the box to a 2U size within a few months as it incorporates custom boards. Currently the product is powered by an Intel-based 1.2-GHz dual processor.

Sarvega's competition includes XBridge Software and DataPower Technology, which is developing a rack-mounted device called XA35 that purports to speed XML processing tenfold, Forrester's Truog says. The DataPower device is slated for availability in the third quarter, he says.

Sarvega's switch is available now. The company declined to discuss pricing. ■

Domino

continued from page 25

Notes, DB2, Oracle and other relational databases can co-exist as you evolve off of Notes," says Chen Lin, CEO and co-founder of ToJava. Lin is a former IBM consultant who once worked on integrating Notes and relational databases.

Lin says the ToJava tool kit also has generic Java-based collaboration features such as calendaring and e-mail that can be used with converted Notes applications. He says the benefits of ToJava are that it ports Notes applications to a platform that can scale, it lets users port data and applications to a widely used Web-based technology, and the effort is being led by Notes veterans such as himself.

ToJava costs $3,000 for an unlimited number of application deployments on a single Web application server. The software is available now. ■

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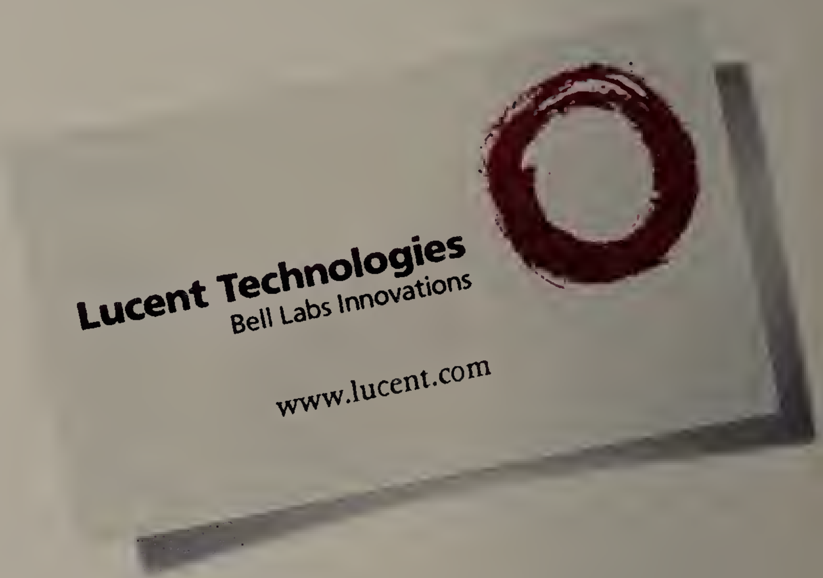


ServiceProviders

■ THE INTERNET ■ EXTRANETS ■ INTEREXCHANGES AND LOCAL CARRIERS
■ WIRELESS ■ REGULATORY AFFAIRS

Jetstream failure casts doubt on VoDSL

Incumbent local exchange carriers slow to take to new technology.

■ **BY MICHAEL MARTIN**

The recent demise of voice-over-DSL equipment provider Jetstream Communications raises questions about the future of voice-over-DSL technology.

Jetstream was the leading voice-over-DSL gateway manufacturer, accounting for almost one-third of voice-over-DSL gateway revenue in the first half of 2001.

While voice over DSL certainly hasn't taken off like proponents anticipated it would, the technology isn't dead, says Matthew Davis, an analyst with The Yankee Group.

But the ATM-based voice-over-DSL gear produced by leading voice-over-DSL equipment manufacturers may not have a long life span, Davis says. Voice over DSL over ATM works by reserving some channels for voice, while saving others for data. On a T-1 line 12 channels could be dedicated to voice and the other 12 to data.

Jetstream manufactured voice-over-DSL gateways that converted digitized voice to conventional voice so voice-over-DSL voice calls could travel over the traditional telephone network.

"The thinking was that the [regional Bell operating companies] had ATM networks that weren't very old and they had Class-5 switches they weren't going to throw away, so they'd invest in ATM-based [voice over DSL]," Davis says. "I think the window for that technology started to close last year when the [incumbent local exchange carriers'] capital expenditures went down."

But ultimately, Davis says he thinks the ILECs will be interested in voice-over-DSL equipment that relies on IP packet transport, instead of circuit-switched ATM. Voice-over-DSL equipment vendors such as CopperCom, General Bandwidth and TollBridge have made strides toward migrating to packet technology, Davis says. But Jetstream wasn't as well prepared for the migration to packet.

Martin Taylor, the CTO of CopperCom, says it's unlikely the ILECs will be interested in voice over DSL soon.

"The market is certainly nowhere near where we expected it to be two years ago," he says.

Taylor says the ILECs saw voice over DSL as a tool that could be used to combat the integrated voice/data offerings of competitive providers.

"Now obviously, the [competitive local exchange carriers'] threat has largely receded in the eyes of the ILECs," he says.

Cable companies also have been slower than expected to enter the voice-over-cable market, delaying another potential threat to the ILECs, he adds.

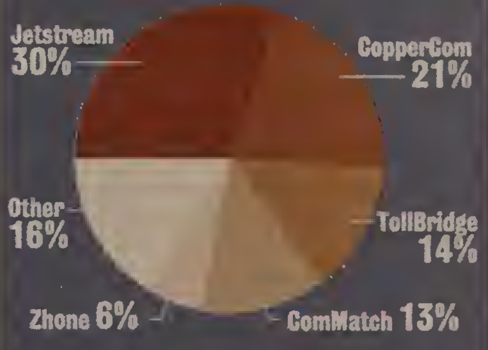
While the large ILECs may not be interested in voice over DSL now, Taylor notes there are a number of CLECs still selling voice-over-DSL service, with several smaller regional incumbent providers.

Broadview Networks, a New York competitive provider, has introduced voice over DSL in four markets. And Network Telephone, a provider based in Pensacola, Fla., has rolled out voice over DSL to several markets in the southeastern U.S. Network Telephone, which was a Jetstream partner, plans to continue rolling out voice-over-broadband services, even though Jetstream is no longer in business, says COO Vincent Oddo.

Oddo says Jetstream is offering maintenance support for at least the next 30 days, and Network Telephone has received several offers from other voice-over-DSL vendors interested in the provider's business. ■

The voice leaders

Voice-over-DSL equipment makers took in $28 million in the first half of 2001. Here's the revenue breakdown:



SOURCE: RHK

Short Takes

■ **Williams Communications Group,** the parent company of wholesale service provider Williams, filed for Chapter 11 bankruptcy protection last week in the Southern District of New York. Williams says its bankruptcy filing is part of a $6 billion debt restructuring deal with the company's creditors. The company says that its carrier division "is not expected to be involved in the Chapter 11 reorganization process." The company also says that services provided by the carrier will remain uninterrupted during this process.

■ **Digex** has expanded its repertoire by introducing a managed hosting service for Linux. Digex officials say the growing demand for Linux-based hosting environments prompted them to add Linux to the software platforms the company manages. Digex also offers hosting services for Microsoft Windows and Sun Solaris. The new Linux hosting service will support Red Hat Linux 7.2 and the Apache Web Server running on Intel-based servers, Digex officials say. As with its other managed hosting packages, all Linux hosted offerings will include administration, monitoring, reporting, and back-up and security services. Pricing starts at about $2,000 per server per month for the fully managed Linux service.

WorldCom beefs up dial-up IP services

■ **BY DENISE PAPPALARDO**

CLINTON, MISS. — The battering WorldCom is absorbing on Wall Street isn't stopping the carrier from beefing up existing products. Witness the recent offering of its Internet Dial Corporate and IP VPN Remote Services that the company says give customers more predictable performance and expanded geographic reach.

WorldCom's enhancements include a new Access Manager client, Internet Dial Analysis tool, Enterprise Services Manager software, the expansion of its global dial-up network, and stronger performance guarantees for dial-up IP users.

WorldCom's new Access Manager client software lets dial-up, DSL, ISDN or cable modem remote users connect to WorldCom's IP network using a unified interface, eliminating the need for multiple clients. The carrier says it will add very small aperture terminal (VSAT) and wireless network support to the client software by year-end.

Later this year WorldCom also plans to increase security support for its remote users by adding a personal firewall to its Access Manager client.

Access Manager also is integrated with WorldCom's new Internet Dial Analysis tool, which is based on Visual Networks software. Network managers access the tool on WorldCom's network. The analysis tool lets customers gather performance and usage information on remote users by communicating with Access Manager. Customers can use this information to better

See WorldCom, page 32

SLA improvements

WorldCom has enhanced its dial-up IP SLAs with stronger packet delivery and minimum latency guarantees.

Internet Dial Corporate SLA:

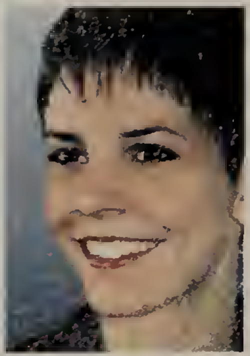
- **95%** network availability.
- **90%** logon success rate.
- **100%** throughput.
- **99.5%** packet delivery in the U.S. and Europe.
- Latency will not exceed **55 msec** in the U.S. and Europe.
- Latency will not exceed **95 msec** between New York and London.

Internet Dial Corporate Gold SLA :

- **99%** network availability.
- **95%** logon success rate.

EYE ON THE CARRIERS

Johna Till Johnson



IP VPNs: Making a case for 'the intangibles'

Last week I broke down IP VPNs into three types: Remote-access VPNs, which connect individual users to the corporate net; branch-office VPNs, in which the IP VPN serves as the corporate WAN; and extranet VPNs, which provide connectivity to business partners, suppliers and customers.

Each serves a different purpose: Remote-access VPNs save money over direct-dial; branch-office VPNs improve performance for certain applications; and extranet VPNs enable new revenue generation.

Most companies have already deployed remote-access VPNs, so we won't cover them here. The real news is the groundswell of interest from large companies in justifying deployment of branch-office VPNs. For these companies, the hard part is creating a solid business case that justifies deployment — even though rolling out an IP VPN is most likely the right thing for them to do.

Why is the business case a challenge? Most companies recognize that the real driver for IP VPNs is the flexibility they provide.

Connectivity speeds can range from sub-T-1 to OC-192, unlike traditional frame or ATM services that are only specified at certain speeds. IP VPNs also allow for a highly flexible topology that lets a seamless mapping to the application flow. So applications with an any-to-any traffic flow are more effectively served by IP VPNs than by frame or ATM, which typically mandate modified hub-and-spoke topologies. Finally, IP VPNs lay the groundwork for true extranet services that will revolutionize supply chains and business processes.

So what's not to like?

The problem is that these features are intangible — and on the only tangible metrics, cost and service-level agreements (SLAs), IP VPNs don't fare so well. Our best estimate is that IP VPN services cost, on average, only about 10% to 20% less than equivalent frame relay services — not enough to justify a forklift upgrade. And while IP VPN SLAs are beginning to rival those of frame and ATM services, they're only as good — not materially better than — those legacy services. So making a hard-core business case to your CIO is more difficult than it looks.

If this is an issue you're wrestling with, here are a few tips:

- IP VPNs are effectively a form of disruptive technology. Disruptive technologies tend not to do as good a job as mature technologies at the functions the mature technologies were designed for. However, they create entirely new functions that create new opportunities.
- Specifically, IP VPNs are interesting because they can improve performance of applications with any-to-any traffic flows, and because they facilitate the connectivity with third parties (extranets). Existing technologies can't handle either one cleanly.

So in practical terms, the best way to get moving on IP VPNs today is to find an application — whether an any-to-any internal application or an extranet application — that justifies a pilot deployment. Voice and video have traffic flows that are highly distributed (any-to-any), which makes VoIP or video over IP an ideal fit. Then measure the quantitative results of the application's deployment (reduced travel time or shortened product cycle development time) to justify the VPN deployment.

And let me know how it goes.

Johnson is senior vice president and CTO for Greenwich Technology Partners, a network consulting and engineering firm. She can be reached at johna@greenwichtech.com.

WorldCom

continued from page 31

plan for and even reduce remote-access costs by establishing remote-access policies, such as requesting that users stay connected for one hour or less, says Brownlee Thomas, an analyst at Giga Information Group.

The tool is available to customers for an additional fee of about 5% above WorldCom's standard service rate, says Ralph Montfort, director of remote services at WorldCom.

The carrier also has expanded its global dial-up support for its Internet Dial Corporate and IP VPN Remote Services to 84 countries. Internet Dial customers can also dial-up from China, but WorldCom cannot support its IP VPN customers in China because of encryption technology restrictions in that country.

WorldCom has on-net dial points of presence in 42 countries. The remaining 43 countries are reached through GRIC Communications' network. WorldCom teams with GRIC to offer users in-country local Internet dial-up support i areas where it does not have its own points of presence.

"These are significant enhancements because it increases the global reach for customers and offers network administrators better control over their remote users," Thomas says.

The carrier also announced its Enterprise Services Manager, which lets network administrators set up user and group policies for remote workers. Administrators can block costly toll-free access numbers for groups or all users. The Enterprise Services Manager also lets administrators set up timers that disconnect users after a certain number of minutes of inactivity.

WorldCom also beefed up its service-level agreements (SLA) with stronger latency and packet-delivery guarantees. Previously, WorldCom guaranteed that latency would not exceed 65 msec in the U.S. and Europe and upgraded that guarantee to 55 msec.

Sprint also offers guarantees that latency will not exceed 55 msec in the U.S., but offers a better guarantee in Europe. Sprint's SLA says latency will not exceed 45 msec in Europe. Sprint's packet-delivery guarantee is also slightly stronger, at 99.7% in the U.S. and Europe.

Customers also can select a stronger SLA that WorldCom calls its Internet Dial Corporate Gold. This SLA offers stronger network availability and logon success rates. WorldCom can support these enhanced SLAs by offering Gold customers access to additional dial-up numbers and POPs, Thomas says. The Gold SLA costs about 5% more per month.

While WorldCom moves forward with service enhancements the company is suffering serious financial setbacks After announcing lower-than-expected revenue projections for this year, WorldCom watched its stock tumble to less than $4 last week.

WorldCom: www.wcom.com

Sprint enters IM market

Provider to offer a secure, hosted platform.

■ **BY MICHAEL MARTIN**

Sprint's E/Solutions group will unveil an instant-messaging service designed for enterprise-class business customers this week at Internet World.

Called Sprint Enterprise IM, the offering is network- and device-independent, meaning it can run over any wireless or wireline network and be accessed from a range of devices, including Palms, Handspring handheld devices, Research in Motion BlackBerry and Windows CE units. Customers can also use it over wireless phones and laptops.

Sprint Enterprise IM consists of a number of third-party software packages. Sprint would not reveal the names of its partners.

Enterprise IM will be available as a hosted service, delivered from one of Sprint's Internet data centers, or housed within a corporate network.

What sets the offering apart from consumer-grade messaging services is security, Sprint says. All communication over Enterprise IM uses Secure Sockets Layer encryption. Customers can add more security.

Enterprise IM relies on text messaging, so it shouldn't strain business bandwidth resources, Sprint says. People can communicate with each other in real time.

Safe and secure

Sprint's Enterprise instant-messaging platform includes security features such as:

- Secure Sockets Layer and Triple Data Encryption Standard logons.
- Token authentication for access to corporate databases
- Operates behind company firewall.

The software can also be tied to a company's databases, letting users input and receive information on the fly.

Enterprise IM supports Wireless Application Protocol, Short Messaging Services and Java 2 Micro Edition.

Businesses using Enterprise IM should be able to cut down on the volume of e-mail and voice mail they have to deal with, says Keith Paglusch, president of Sprint E/Solutions.

Paglusch says Enterprise IM is suitable for businesses with more than 50 employees, although he expects that most firms adopting the system will be much larger.

Sprint's biggest competitor on the hosted and implementation assistance side will be IBM, Paglusch says.

A variety of business-class packages already exist for companies looking to implement an instant-messaging system in-house from companies such as Lotus, Jab Cast, Bantu, Divine Software, Jabber, WiredRed and Ikimbo.

The financial community also has a product hosted by a company called Communicator.

Business-class instant messaging is a market that's still in its infancy, says Rob Lancaster, an analyst with The Yankee Group. Some companies informally use consumer-class instant-messaging services. Others are just beginning to look at instant messaging, because in the past the service was often regarded as a consumer-class tool, used largely by teenagers.

Security has also been a major concern, Lancaster says. But business-class instant-messaging providers have made security a top priority.

Enterprise IM is available immediately. The price of the service will vary depending on the size of the organization and the amount of work required to integrate the software with a customer's databases.

Companies can trial the software for free by registering at Sprint's Web site and downloading the client at www.sprintsolutions.com/imdownload. The free trial can be used for up to 20 seats for 60 days. ■

The Edge

■ SERVICE PROVIDER DEVELOPMENTS
AT THE JUNCTURE BETWEEN THE ENTERPRISE
AND THE NEW PUBLIC NETWORK

Juniper unveils 'Gibson' core router

Next-generation Internet platform raises bar for 10G density, demonstrable terabit scale.

■ **BY JIM DUFFY**

SUNNYVALE, CALIF. — Juniper Networks last week unveiled its long-anticipated next-generation core router, a 640G bit/sec device that raises the bar in terms of 10G bit/sec density and is intended to scale to multiterabit throughput.

However, Juniper's T640, which has been commonly known as Gibson, includes upgrade requirements that may give carriers pause. Also, Juniper claims it can demonstrate the terabit routing capability of this device today, but the company won't say when it will be available in a future upgrade.

And the company's 10G bit/sec density advantage may be short-lived because a next-generation platform from Cisco is said to be on the horizon, perhaps in trials late this year.

Regardless, Gibson could give Juniper a kick-start in 10G bit/sec core routing. The company lost more than half of its share in the 80G bit/sec router market between 2000 and 2001 since Cisco began shipping OC-192c on its 12400 series a year ago, according to Dell'Oro Group.

In addition to Cisco's market entry, Juniper's market share slip could have been caused by deferred purchases of the company's M160 core router in anticipation of Gibson, a packet-misordering situation in OC-192c on the M160, or both. Juniper has corrected both situations.

The eight-slot, half-rack Gibson is shipping and running production traffic at NTT/Verio and France Telecom, and in two research networks. It includes new Juniper Internet Processor ASICs — the T-series — that are optimized for high-density 10G bit/sec: 32 OC-192c interfaces into a single chassis vs. eight for the M160, and 16 for Cisco's 12416 Internet Router; and 20 for Avici's Terabit Switch Router, which both occupy full racks.

Gibson also sports 128 OC-48c links, which are carried forward from the M160, and 128 Gigabit Ethernets interfaces.

The T-series ASICs, which perform more than four times as many route lookups per second as the M160, also do not reorder packets as they enter or exit the router. Keeping IP flows intact apparently alleviates the potential to misalign packets in a flow, which can disrupt communication. This situation exists in Juniper's OC-192c cards for the M160, but only under extreme and rare conditions, the vendor says. It did not significantly impact any customers, company officials say.

But that also means OC-192c blades from the M160 are not forward-compatible to Gibson. Carriers requiring the horsepower of the new router will have to purchase not only a new chassis but also new 10G bit/sec line cards.

Some analysts say this will result in deferred purchases of Gibson as service providers try to negotiate with Juniper to get better pricing options for the upgrade.

"There is a customer-transition risk due to a lack of a 'graceful' upgrade to the T640 for existing M160 customers," says UBS Warburg Analyst Nikos Theodosopoulos in a recent report on Gibson. "While all of this should not be surprising to customers, it could cause some of the larger carriers some concerns given the current capex crunch. This could cause some customers to delay adopting this product and trying to possibly negotiate better financial terms to compensate for the lack of compatibility on the OC-192c line cards."

Other analysts didn't see the upgrade requirement as a deal breaker, but indicated that Gibson may be ahead of its time.

"It's not immediately necessary for service providers, but a good technology race [for Juniper] against Cisco," says Kevin Mitchell, directing analyst for service provider networks at Infonetics Research. "And service providers have to upgrade to gain additional density sometime, so it's either with Juniper or someone else."

That someone else could be Cisco. The vendor is working on its next-generation core router, referred to as the HFR, which is believed to sport 16 40G bit/sec-capable slots per chassis.

HFR also may present its own upgrade challenges as Cisco is said to be writing an entirely new operating system for this device. Cisco says it does not comment on "rumors" and, thus, did not deny the development of this new operating system.

Employing the math of vendor marketing officials — who double count packets — HFR is a 1.28T bit/sec single-chassis router. Cisco plans to link multiple chassis to achieve even greater scale, but this is something Juniper says it can demonstrate today and ship within a reasonable time frame to any carrier requiring it soon.

The Gibson rollout includes a switching matrix called TX that Juniper says can link eight or more T640s to achieve at least 5T bit/sec of nonblocking throughput. Juniper says it will demonstrate TX publicly May 22, but the vendor declined to divulge a release date for its commercial availability.

However, the need for that level of scale may not emerge until late 2003 and into 2004, says Kevin Dillon, director of portfolio marketing at Juniper.

Five switch fabric cards on the T640 have dedicated optical connections to the TX. A half-rack TX can link four T640s; a full-rack, eight.

These dedicated optical backplane extensions have hundreds of lasers that operate at 1.8G bit/sec, for a total throughput of 1.28T bit/sec for a single T640-to-TX local connection. Multiplying this by eight T640s achieves a greater than 10T bit/sec system, Juniper says. ■

What's in a name?

Features of Juniper's new T640 router, which was code-named Gibson while in development:

- 640G bit/sec switching capacity.
- 32 10G bit/sec interfaces per half-rack chassis.
- Based on new series of ASICs "optimized" for 10G density.
- Eight slots, 40G bit/sec per slot.
- Five switch fabric cards with dedicated optical interconnection to switch matrix.
- TX switch matrix connects four to eight T640s for 5T bit/sec scale.
- New OC-192c cards do not reorder or misorder packets.

Short Takes

■ **Quantum Bridge Communications** last week announced that **Time Warner Cable's Tampa Bay division** is deploying QB's **Optical Access System** to deliver fiber-based data services to business customers. Time Warner, Tampa Bay is currently using the system to provide IP and Ethernet data services from 1M to 100M bit/sec to 50 business customers. The equipment is installed in 12 of Time Warner, Tampa Bay's 72 points of presence, with plans to deploy it in 36.
www.quatumbridge.com

■ Mobile-wireless equipment vendor **Tahoe Networks** last week announced the appointment of **Rick Morris** as vice president of engineering. Morris, an 18-year veteran in the industry, joins Tahoe from Jetstream Communications, a provider of voice-over-broadband equipment to carriers, where he was vice president of engineering. Prior to that, Morris was director of switching and technology development at IBM's networking division in Research Triangle Park, N.C. Morris will report to Tahoe President and CTO **Arthur Lin**. Lin, who previously ran the engineering organization, will focus on new technology development and customer engagement.
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■ AN INSIDE LOOK AT THE TECHNOLOGIES AND STANDARDS SHAPING YOUR NETWORK

USB 2.0 boosts bus speeds

■ **BY JEFF CHANG**

Over the past five years, PC users, network managers and developers have grown to see the value of the Universal Serial Bus standard. USB offers universal plug-and-play and extreme ease of use. When a USB peripheral is connected to a USB-enabled PC, the system will autodetect and autoconfigure the device. USB also eliminates the need for multiple I/O standards, simplifying PC connectivity.

However, the original USB specification, Version 1.1, had one drawback — lack of bandwidth. With a top speed of 12M bit/sec, bandwidth sharing has long been a major issue with USB. That is about to change.

Enter USB 2.0

The USB specification was recently updated to improve the performance and usability of PC peripherals, opening the door to a world of high performance and high bandwidth, such as mass storage, digital video and broadband access. The speed of USB 2.0 has been increased to 480M bit/sec, a 40-fold improvement over Version 1.1.

Perhaps the most important feature of USB 2.0 is that it is forward- and backward compatible with existing USB 1.1 devices and systems. The connectors, software, cables and other external product aspects are all the same. Existing USB 1.1 peripherals will continue to work with PCs equipped with USB 2.0, and vice versa.

Inherently, USB is a master-slave (or host-peripheral) architecture. The PC host is in charge of all the devices attached to it. It initiates all communications, and devices do not "speak" unless they are spoken to. This type of architecture leaves much of the system intelligence on the PC, letting the USB peripherals be designed and implemented in a cost-effective manner — an important feature for the cost-sensitive PC market.

At the electrical level, USB is a four-wire serial interface — power, ground and two data lines for differential signaling. There are three distinct speeds supported by the USB specification:

- Low-speed — 1.5M bit/sec.
- Full-speed — 12M bit/sec.
- High-speed — 480M bit/sec.

Having three speeds gives developers the flexibility to choose between multiple price/performance levels when implementing their designs. For example, hardware devices for low-speed applications such as mice and keyboards can be scaled back in cost to provide the minimum functionality required.

A typical USB transaction has three phases:

- Token packet.
- Data packet.
- Handshake packet.

The packets consist of encoded bit fields, and devices will respond to packets addressed only to them. The host also sends out a start-of-frame packet every millisecond in full-speed mode and every 125 msec in high-speed mode to keep the entire bus synchronized. The host will access multiple devices within a single frame to optimize bandwidth allocation.

There are three pieces to the puzzle that need to be in place in order for USB 2.0 to become a ubiquitous interface on PCs:

1. **Host hardware support** — USB 2.0 host hardware is available now in the form of PCI add-on cards or PCMCIA cards. Chipset vendors are currently evaluating integrated USB 2.0 products with their development partners, and should be in full production by the fall. Chipset integration is a key driver for adoption rates.

2. **Host software support** — USB 2.0 host software is available today from Microsoft for Windows XP and Windows 2000. Although these drivers are not native to the shrink-wrapped product on the store shelves, they are available through Windows Update, a feature in Windows that lets users download upgrades to their software packages. Microsoft also plans to backport support for USB 2.0 to Windows Millennium Edition.

3. **USB 2.0 peripherals** — USB 2.0 peripherals are available today. There are a number of certified devices that are in production, and many more will hit store shelves in 2002.

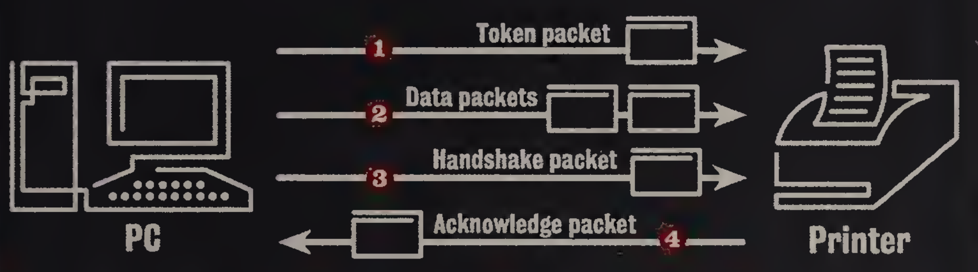
Although mainstream adoption is not expected until the second half of next year, many OEMs will ship USB 2.0-enabled PCs between now and then.

Chang is product marketing manager, Personal Communications Division, Cypress Semiconductor. He can be reached at JTC@cypress.com.

HOW IT WORKS

USB 2.0

The new Universal Serial Bus 2.0 standard increases bandwidth from 12M bit/sec to 480M bit/sec. USB 2.0 uses a master-slave architecture in which the host PC initiates all communications and the peripheral devices don't speak unless spoken to.



1 PC initiates communication with peripherals via token packet that tells peripheral devices data is about to be transmitted.

2 PC transmits data packets.

3 PC sends handshake packet to confirm that data was received.

4 Device sends acknowledge packet back to host PC.

Ask Dr. Internet

By Steve Blass

We have a Linux firewall and Web server using a fixed external IP address, and another Web server running on an internal network that we want to make available to the outside world so users can get to the JSP pages on that server. At present, we use ipchains masq to give all internal PCs access to the Internet. Do we use a similar masq or just ipchains for the outside world to get to the internal Web server?

According to the Linux Ipchains How To Web site (http://howtos.linuxbroker.com/IPCHAINS-HOWTO.html), "There are ways to allow the Internet to access your internal services, rather than running the services on the firewall. These will work with either a proxy or masquerading-based approach for external connections. The simplest approach is to run a "redirector." . . . An example of this is the redir program. . . . Another approach is to use port forwarding in the kernel."

The basic scheme is to add rules of the form "ipchains -A outside-inside -p [tcp|udp] —dport [portnum] -j ACCEPT" for each service you want to make accessible. More examples are available from http://uber.chorn.com/ipchains.html.

Blass is a network architect at Change@Work in Houston. He can be reached at dr.internet@changeatwork.com.

GEARHEAD
INSIDE THE
NETWORK
MACHINE
Mark
Gibbs

The end of Web services

As promised, this week we will wrap up Web services, a topic that has occupied us for the last gazillion weeks. And to be honest, all we have managed to do in this series is scratch the surface and brush against the high points because of the sheer scope of the territory.

What is problematic is how to stay on the technical curve with these emerging services. In this final column on the topic, we'll look at resources that can help you out.

As we discussed in the first part of the series (www.nwfusion.com, DocFinder: 9126):"Web services have evolved into a five-layer model providing, as it were, a stack. This stack, going from lowest to highest, consists of network, transport, packaging, description and discovery layers."

You are already comfortable with the first two layers of this model — they are the virtual nuts and bolts of the Internet: TCP/IP sitting under HTTP or FTP or whatever protocol you please.

But let us be quite clear — if you don't have a solid grasp of XML you ain't goin' nowhere with Web services. Pretty much everything that matters from the packaging layer up depends on XML. We recommend XML.com's "A Technical Introduction to XML" (www.nwfusion.com, DocFinder: 9191) and Microsoft's "Microsoft XML 3.0 — XML Tutorial" (DocFinder: 9192).

So onward and upward. . . . Simple Object Access Protocol (SOAP), the only current choice at the next layer, is relatively easy to come to grips with. Not only is the protocol well documented (the World Wide Web Consortium's SOAP specification is a must-read, www.w3.org/TR/SOAP/) and analyzed (riveting stuff from Microsoft at DocFinder: 9193) but there are also plenty of tools to help you experiment.

For example, there is PocketSOAP (www.pocketsoap.com/pocketsoap/), a COM component that is a SOAP client for Windows. This originally was targeted at the PocketPC, but there is now a version that works on Windows 95/98/Me/NT4 /2000/XP.

PocketSOAP includes support for HTTP, but the transport, claims author Simon Fell, can be easily replaced. And if you get really deep into SOAP, check out Fell's 4s4c — "Simon's SOAP Server Services For COM: a set of components for exposing COM objects as SOAP Web services" (www.pocketsoap.com/4s4c/).

At the top of the Web services model is one of the newest and still evolving standards: The Universal Description, Discovery and Integration (UDDI) protocol. We recommend you take a look at Systinet's Wasp UDDI, a free UDDI server for development and testing (DocFinder: 9194).

So what to test against? Try Microsoft's MapPoint .Net (DocFinder: 9195), a Web service that lets you "integrate high-quality maps, driving directions, distance calculations, proximity searches and other location intelligence into your applications, business processes and Web sites."

Another good service to test your SOAP programming skills against is the Google Web APIs (www.google.com/apis/). This service (currently in beta and free for noncommercial use) lets users "query more than 2 billion Web documents directly from their own computer programs."

The service also will exercise your skills with Web Services Description Language (WSDL, www.w3.org/TR/wsdl) as the Google APIs handle SOAP messages defined by WSDL, the 800-pound gorilla of the description layer. Unfortunately, WSDL tools are not currently plentiful — see Simon Fell's "WSDL Tools" (DocFinder: 9196).

Finally, check out the Web service XSpace Version 1 (www.xmethods.net/ve2/XSpace.po) from XMethods. XSpace is "a multiuser shared 'key/value' space that allows you to store arbitrary string values that are easily retrievable with an associated key . . . essentially a simple, flexible, globally accessible database service." Very interesting and a cool test vehicle.

So what will Web services mean to you? As our better half, that hack who writes Backspin noted last week in his column "<My brain hurts/>" (DocFinder: 9190), "think of . . . knowing how every piece of data [in your organization] was generated and why, and where it fits into your business and how it can be moved around, distributed and modified. The implications for how we do business in the private and public sectors, and how we are entertained, informed and interact are profound."

We're not surprised his brain hurts. Next week, more brain, less drain.

Serve your comments to gearhead@gibbs.com.

Cool Tools

Quick takes on high tech toys

By Keith Shaw

One of the first products I tested for the Cool Tools column was a handheld pen scanner that you could use to scan text from a magazine, newspaper or other source, and store it in the device to use later. It was a great idea that fell short in its execution.

It wasn't a great experience, so I avoided looking at similar products until now. I'm happy to report that handheld image-scanning technology has improved.

The IrisPen II Executive from Image Recognition Integrated Systems is an extremely accurate and fast handheld pen scanner that can capture text, images, bar codes and handwritten numbers. The device connects to a user's notebook or desktop PC via Universal Serial Bus (USB) cable and can scan text directly into applications, including Microsoft Word.

The device and application were easy to set up, and learning how to scan with the device took no time at all. If you have employees who need to do a lot of data input of documents, this scanner may help them be more productive.

The scanner works well with newspaper and magazine scanning, but you are limited by the USB cable connected to the computer, so it's less portable than the pen scanner (from a different company) I tested two years ago. Narrow columns of text (and larger text in headlines) found in magazines and newspapers tend to increase the number of errors you get.

The IrisPen II Executive costs $130, and can be ordered at www.irisusa.com

IrisPen II Executive captures printed text and handwriting.

Table tote portable workstation

From PC Tables comes the Table Tote Portable Workstation, a portable stand/table that sets up in minutes. You've probably seen some people using these in airport waiting areas. The table is a good way to get the laptop off your lap and onto a more stable setting.

The table's surface area is small enough for your laptop, and the top surface can extend out for additional work space. The four legs are stored inside the tabletop, and are easy to attach to the base. Our first attempt formed a wobbly table, but consecutive attempts yielded better results.

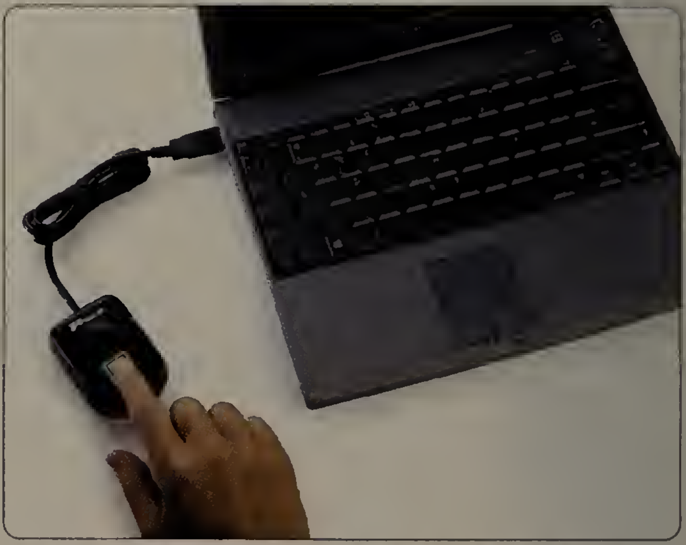
The table weighs three pounds, which puts it on the border on whether it's light enough to add to your laptop bag. It costs $50, which may be a bit high for casual users. But if you do a lot of traveling and need a better workspace than your lap, it's a good investment. Head to www.pctabletote.com for more information.

Targus Defcon Authenticator

Securing your laptop with locks or passwords is one thing, but what's really cool is securing it via biometrics. We recently tested out Targus' Defcon Authenticator Security System with USB hub, a pocket-sized fingerprint scanner and authentication software for Windows 98, Millennium Edition and 2000 systems.

Smaller than the palm of your hand (measuring 2.7 by 1.9 by 0.8 inches), the fingerprint scanner connects to the USB port of a laptop. After installing the SecureSuite software, an end user (or administrator) can add fingerprint scanning to the choices of authentication method. After verifying the user's fingerprint three times (you can choose which finger to scan, a nice feature), the system is ready to go. The software lets you decide whether to require both a password and a fingerprint scan, or whether just one method will suffice. Once a user has logged on, there's a nice feature that lets you lock down the workstation and only regain entry with the fingerprint or password. This is good for users who want to walk away from their laptop and keep prying eyes away.

The software has a good blend of easy-to-use features for end users, and some good higher-end features for IT administrators (such as document and folder encryption). The Defcon Authenticator costs $120, and can be ordered online via Targus' Web site at www.targus.com.



Targus Defcon Authenticator lets you secure your laptop with a fingerprint.

Shaw can be reached at kshaw@nww.com.

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"Cyberland Defense: Rethinking Network Security for a Dangerous World".
Wednesday
May 8th, 5:00pm
Moderator: John Gallant

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Show Planner 2002

Despite the stuttering economy that's been especially tough on technology vendors, there are network developments that businesses want to track. And that's where a show like NetWorld+Interop 2002 Las Vegas comes in.

"The economy is affecting vendors a great deal, obviously," says Valerie Williamson, president of Interop Worldwide. "But on the enterprise side they're still buying products. Just because the economy is doing badly doesn't mean innovation comes to a halt."

> **"Just because the economy is doing badly doesn't mean innovation comes to a halt."**
>
> ***— Valerie Williamson, president, Interop Worldwide"***

And innovative technology and voices are what N+I is about. Voice over IP will be featured extensively throughout the event and Serge Tchuruk, Alcatel's CEO, will make his first speaking appearance at a North American trade show.

If you have plans to head to Las Vegas, here's the guide for sessions and events you should attend.

MONDAY MAY 6

Network forensics

10:45 to 11:45 a.m.

No company's network runs perfectly, and this session teaches network professionals how to use a variety of tools to track down weaknesses in their networks' security and reliability. Bill Alderson of Pine Mountain Group, a network training firm, also will delve into the question of how IT should work with upper management to ensure any weaknesses uncovered are addressed.

A framework for implementing voice over IP

1:45 to 2: 45 p.m.

It seems like voice over IP has been around forever. Still, VoIP is far from being a mainstream application. Steve Taylor of Webtorials.com will discuss the advantages and disadvantages of VoIP, and what's involved in getting the technology up and running.

TUESDAY MAY 7

SLAs: Getting the proper foundation

10:15 to 11:15 a.m.

Service-level agreements are a must-have for any mission-critical networks or applications. Unfortunately, getting a service provider to commit to any meaningful SLA can be like pulling teeth. John McConnell, president of McConnell Associates, will go over what measurements businesses need to have covered in an SLA, how businesses can track those measurements and how businesses can deal with a service provider that fails to deliver.

Leveraging active directory for Windows 2000/XP applications

11:30 a.m. to 12:30 p.m.

One of Windows 2000's biggest-selling points is supposed to be Active Directory, which is designed to let users handle more management information and integrate more business processes through the directory. Despite Active Directory's promise, its complexity intimidates many users. Daniel Blum of The Burton Group will explore the potential of Active Directory and present user implementation experiences.

IP QoS for the enterprise

2 to 3 p.m.

Achieving solid quality of service on IP networks is still an issue for business customers looking to switch mission-critical processes from a frame relay or ATM network to IP. *Business Communications Review* editor Fred Knight will discuss various IP quality-of-service tools, including Differentiated Services, Resource Reservation Protocol and Common Open Policy Service. Knight also will examine which applications benefit the most from QoS. Speakers include Todd Krautkremer, vice president with Packeteer; and Peter Thompson, CEO, Degree2 Innovations.

IP storage

3:15 to 4:15 p.m.

Field sales forces and other remote workers need access to important business information, such as customer records and inventory, to do their jobs properly. Ahmad Zamer of Intel will examine how companies can IP-enable their storage infrastructures to make information available to any employee over any type of connection.

[illegible]

Meeting the eNet challenge

5 to 6 p.m.

Every year the network built and used at the N+I show is one of the event's biggest highlights. This year's network, which includes a mix of wireless and wireline technology, will follow that tradition.

Gordon Stitt

A panel of vendors, headed by Gordon Stitt, CEO of hardware supplier Extreme Networks, will discuss the latest technologies being used in this year's Interop network. Given that this year's network includes more than 12,000 nodes and was built in just four days, the discussion is bound to be entertaining. Panelists include Thomas van Overbeek, CEO, Shoreline Communications; Ray Martino, vice president of wireless network products, Symbol Technologies; and My Chung, group president, Spirent Communications.

WEDNESDAY MAY 8

A pragmatic approach to evaluating broadband access

10:15 to 11:15 a.m.

A year ago, metropolitan Ethernet was a red-hot technology, and metropolitan Ethernet providers, such as Yipes Communications, were the toast of many trade shows. Now, Yipes is in bankruptcy, and many competitive providers also offering metropolitan Ethernet services might not be far behind. Chris Nicoll of Current Analysis will go over what factors users should look at when selecting a metropolitan Ethernet provider, including price, performance, security and last, but by no means least, financial stability.

VPNs — Build or buy

11:30 a.m. to 12:30 p.m.

VPN technology is in demand. One of the first and most important decisions a business faces when deciding to move to a VPN is whether to build in-house or outsource.

John Pironti, a consultant with ISP Genuity, and a panel including representatives from Cisco and Computer Associates, will discuss the pros and cons of building and outsourcing VPNs.

IP telephony success stories

2 to 3 p.m.

IP telephony frequently is touted as a way companies can save money by avoiding the hefty cost of a traditional PBX and moving from separate infrastructures for voice and data to one unified infrastructure. Finding companies that have taken the plunge and adopted IP telephony isn't easy, though.

Marv Chartoff of Cap Gemini Ernst & Young will be one of several speakers talking about how their companies implemented IP telephony and what pitfalls users should avoid when implementing their own converged networks. Speakers include Anita Dulude, technical services director, Thrupoint; Don McGill, director of client services, CNET Networks; Mike Shisko, director of IT with Experio Solutions.

Technology insight at iLabs testing

The InteropNet Labs is N+I's live test bed designed to give attendees hands-on, unbiased insight into the state of emerging technologies. ILabs is located on the show floor, open to all attendees and runs during exhibition hours. A team of volunteer network engineers, including Network World Test Alliance partners Joel Snyder of Opus One and Ken Percy of Miercom will conduct these testing demonstrations.

ILabs Las Vegas focuses on the areas of wireless LAN security where engineers will offer the first public demonstration of 802.1X, Extensible Authentication Protocol and IP Security interoperability; IP storage networking based on iSCSI technology; and Multi-protocol Label Switching, where testers will implement interoperable point-to-multipoint Layer 2 VPNs.

For a schedule of these free classes, e-mail ilabs@interop.net.

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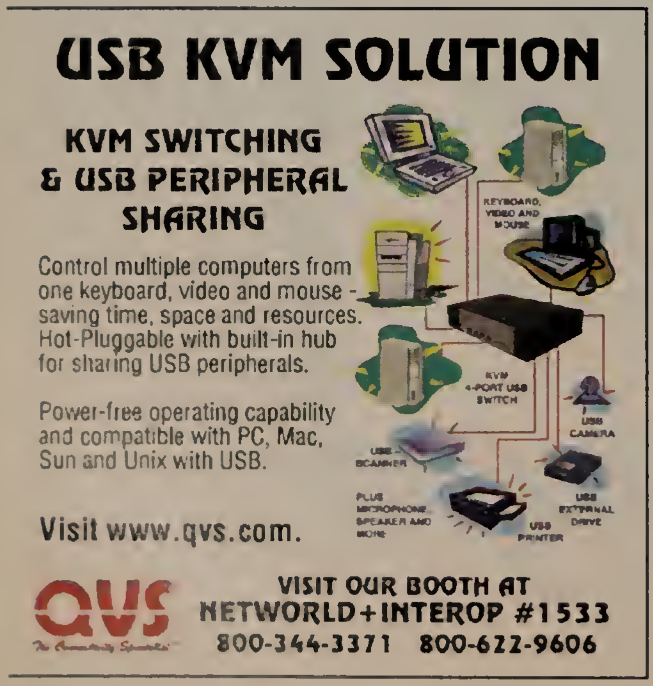

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Quality of service: An enterprise/service provider collaboration

3:15 to 4:30 p.m.

Securing quality of service on an enterprise network isn't that tough. After all, a company knows exactly what equipment it has deployed, what tools it needs to monitor that equipment and the traffic flowing through it.

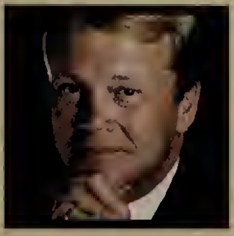
Ensuring adequate QoS on the WAN isn't so simple though. Companies have to work closely with their service providers to ensure they get the service quality they need.

Tere' Bracco of Current Analysis and a panel of network equipment vendors and service providers will discuss how companies can coordinate QoS with their service providers. Speakers include Gene Arantowicz, technical marketing manager, Enterprise Solutions Design Group, Cisco; Jeff Dean, group product manager, Converged Enterprise Services, Genuity Solutions; and Rick Khan, IP telephony expert, Dimension Data.

PICK OF THE DAY

John Chambers keynote

9 to 10 a.m.



John Chambers

As Cisco goes, so goes the network industry. This makes Cisco CEO John Chambers' keynote addresses a hot ticket at any trade show.

Chambers will address how companies are looking to "get back to basics" in today's tough economy.

Getting back to basics, though, doesn't mean firms shouldn't invest in any new technology at all.

Chambers will examine how companies can integrate business and technology tools and use them to tie together an organization and a supply chain of partners.

Virtual organizations, linked together by a network of networks, can achieve operations efficiencies and better flexibility, making investments in new technology worth the money spent.

Cyberland defense: Rethinking network security for a dangerous world

5 to 6 p.m.

In the wake of the terrorist attacks on Sept. 11, the security of corporate and service provider networks is on every network manager's mind. *Network World* President and Editorial Director John Gallant will lead a panel of security experts as they look at how secure networks are and what measures companies should take to secure their mission-critical networks. Panelists include Christopher Klaus, founder and CTO, Internet Security Systems; Robert Thomas, CEO, NetScreen Technologies; Sandra England, executive vice president, Network Associates; Keith Rhodes, CTO, the U.S. General Accounting Office; and John Roese, CTO, Enterasys Networks.

THURSDAY MAY 9

New server architectures

12:45 to 1:45 p.m.

Servers today are built to perform specific tasks efficiently, so making sure you get the right server for the job is critical. Duncan Hill, CTO, Think Dynamics, will examine some server innovations that are helping drive business networks. Software that helps users manage server clusters also will be discussed.

SANs and NAS: The evolution of network storage

2 to 3 p.m.

Alistair Croll, CEO of Coradiant, will examine how companies can use the newest network-attached storage and storage-area network advances to keep up with the daunting heaps of information they're generating.

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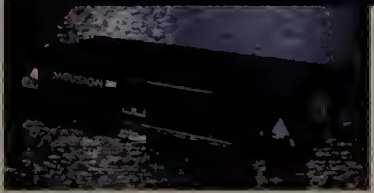

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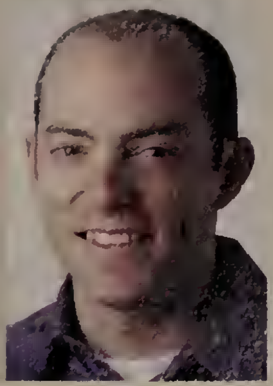

EDITORIAL

Michael Martin

Cable curbs create a stir with users

Not surprisingly, our April 8 story on Time Warner's plans to crack down on cable modem bandwidth hogs by establishing monthly download limits created quite a stir. The gist of the story was that users exceeding a monthly download limit would have to pay a surcharge (see www.nwfusion.com, DocFinder:9130).

At press time, there were almost 500 messages in the online forum tied to the story.

Most of the reaction was predictably negative. No one likes the idea of paying more for a service, unless they're getting something back in return. People like the idea even less when it's coming from a giant like Time Warner, which has a virtual monopoly on cable services in the areas where the company operates.

But not all of the reaction was negative.

Some readers agree with the idea that people who overly tax the infrastructure should pay more. It's not fair if someone pays $50 per month so they can surf the Web more efficiently, only to find out they're getting lousy performance because the next-door neighbor is running a server off their $50 per month cable modem connection.

While Time Warner has yet to spell out pricing details, conceivably the company could set a monthly download/upload ceiling so high that it would affect only those customers using their high-speed connections to run servers.

Time Warner isn't the only cable outfit looking at changing its pricing plans. Cox Communications recently unveiled lower bandwidth/lower cost options for customers who don't want to pay $50 per month for broadband. And other cable firms have hinted they too will adopt tiered pricing schemes, potentially charging users who want higher bandwidth more, while offering lower speeds for lower monthly costs.

The "one price fits all" philosophy cable companies used for selling high-speed Internet services worked well in filling up the relatively empty networks they'd built and helped them establish a solid customer base.

But that model doesn't work anymore, partly because customer demand is changing and partly because the cable firms now have sophisticated traffic-monitoring software in place that lets them enforce bandwidth thresholds.

While heavy Internet users may end up paying more for their monthly service, there could be a silver lining in the cloud. Now that cable companies have better control over their networks, they should be able to offer some sort of service-level agreements to their higher-end customers.

— Michael Martin
Senior writer
mmartin@nww.com

No more bandwidth buffet

The story "Time Warner: Bandwidth hogs, pay up!" (www.nwfusion.com, DocFinder:9122) says, "If one home or business is using its connection to transfer large amounts of data, performance for all other homes or businesses that rely on the same access pipe is affected" — as if this is a new discovery. The telephone companies have been dealing with the same issues for decades, and still, only long-distance is usage-based. Gee, how do they manage?

Those who fail to learn from history are doomed to repeat it. No one likes the implications of usage-based pricing. No one wants metered Internet access.

It's not as if Time Warner is providing any service-level guarantees. Clearly, what the provider wants is the ideal customer — one who pays promptly and never uses the service.

Also, the story contradicts itself, first stating, "DSL networks are less susceptible to bandwidth hogs than cable networks," then "But bandwidth hogs could still affect performance for other DSL users on the same DSLAM if the connection from back into a service provider's Internet point of presence was not large enough."

Time Warner simply does not want to do what it takes (that is, spend money) to build an infrastructure that can satisfy customer demand.

The message you should be relaying to the DSL and cable ISPs is that usage-based pricing sucks. Business accountants do not like the uncertainty of inconsistent monthly charges based on variable usage. Usage-based billing will fail because a competitive service will eventually emerge offering flat-rate pricing.

Buddy Shipley
Vail, Colo.

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

It absolutely boggles my mind that in a time when ISPs that offer broadband are wringing their hands and moaning about the lack of subscriber growth, they're doing everything they can to ensure consumer dissatisfaction.

Ed Poplin
CEO and principal
LonePalm Graphics
St. Petersburg, Fla.

Humorous ad

I found the "We have your way out" advertisement from Microsoft and Unisys about their "Unix alternative" very amusing (www.nwfusion.com, DocFinder: 9123). Let's address the ad's first paragraph: "No wonder Unix makes you feel boxed in." What company has the most proprietary operating system on the desktop? "It ties you to an inflexible system." What company makes you use all its products by making competing products work badly? "It requires you to pay for expensive experts." Can you say Microsoft Certified Systems Engineer? "It makes you struggle daily with a server environment that's more complex than ever." What do you call Active Directory?

For all its complexities, I'd rather administer a Unix system because it is much easier to get diagnostic information from than a Windows system. Configuring with simple text files beats the pants off the registry. I can back up entire enterprise configuration files on one floppy. Neither operating system has a consolidated technical manual, but TechNet comes close, and both operating systems have legions of folks on the Internet that love solving problems. You can connect a Unix system to virtually anything because the Unix community wants it that way.

Microsoft wants everything its way, using its products. Soon Unix will have a great desktop like Windows, and the real competition will begin.

Ed Seger
Severna Park, Md.

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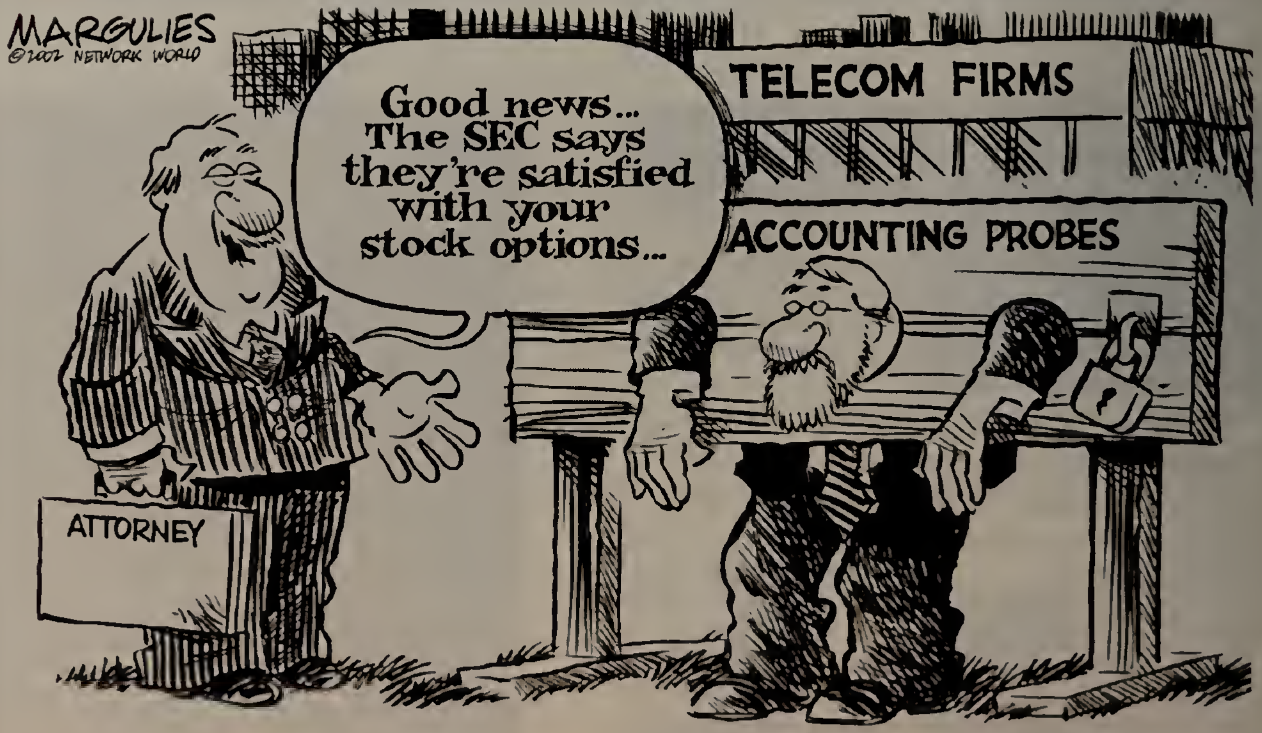
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Steven Taylor

Moving to VoIP is a 'brainer'

With 20-plus years in the industry, I long ago stopped counting the number of seminars in which I've taken part. But I can truly say the *Network World* Voice over IP tour, which recently concluded after stops in six cities, was like no other seminar with which I've ever been involved. VoIP doesn't have revolutionary new technology. There isn't a single killer application. It's not faster. The quality isn't better. And it doesn't offer an order of magnitude difference in cost savings. Nevertheless, the seminar was sold out weeks in advance and the level of participation from the attendees was phenomenal.

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When I reflect on the bottom line from the tour, it turns out that the decision to move to voice over IP isn't a "no-brainer" where you see a dramatic decrease in costs with a return on investment of 100% in the first year. Instead, voice over IP is a "brainer." It's a sophisticated decision that involves the entire IT infrastructure. In fact, a show-of-hands survey in most cities showed essentially equal participation from people from the voice, WAN data and LAN data sides. And that's where the "brainer" part of the VoIP migration starts.

A move to VoIP involves the most fundamental change our industry has ever seen. We're moving from the voice world and the data world to the voice and data and application world. This move involves — and necessitates — breaking down the barriers that, for reasons ranging from government regulation to job security, have fragmented our IT departments and decisions.

My favorite part of the seminar was the "best question" contest, where attendees were invited to submit questions for a panel of industry experts. The majority of questions were about business issues. Again, this shows how moving to VoIP is a brainer.

The business case for VoIP involves looking at the entire IT infrastructure and enabling applications that will revolutionize how companies conduct business. These applications — ranging from unified messaging to IP-enabled contact centers — are no longer shackled by traditional voice/data/video boundaries. But because they are not simple extensions of existing business models, they require a thoughtful and creative business case.

The best — and simplest — question from the entire tour came in Chicago: "What's the cost of not going to VoIP?" It also has one of the simplest answers: You'll be behind your competition. The world is on a gradual but irreversible evolution to VoIP. Those who begin the journey now will be leaders with the commensurate competitive advantage. It's time to move.

Taylor is president of Distributed Networking Associates and editor/publisher of Webtorials.com. He can be reached at taylor@webtorials.com.

The world is on a gradual but irreversible evolution to VoIP.

ABOVE THE CLOUD

James Kobielus

Federation key to Web services

Heterogeneity rules in network security environments. In the stubbornly multi-organizational, multidomain and multivendor world of Web services, the political concept of "federation" takes on new meaning. Federation describes scenarios in which no one group or organization manages all users and resources in a distributed application environment. Instead, administrators in diverse domains must manage local security policies that support mutually beneficial transactions among their respective spheres of operation.

The term federation derives from the Latin word for trust. In the world of distributed network services, the term refers to the need for trust agreements among decentralized security and policy domains. Federation lets access-management functions span diverse organizations, business units, sites, platforms, products and applications. Federation requires that an organization trust each trading partner to authenticate its own users' identities. In a federated environment, a user can log on to his home domain and access resources transparently in external domains, such as those managed by customers or suppliers, subject to various policies defined by home and external administrators.

You increasingly will see the term federation used with a new security standard, the XML-based Security Assertions Markup Language (SAML) 1.0, which is nearing ratification by the Organization for the Advancement of Structured Information Standards (OASIS). Web access-management vendors such as IBM/Tivoli, RSA Security/Securant, Netegrity, Oblix, Entegrity, Entrust Technologies and Sun/iPlanet have rallied around SAML 1.0 as a means for establishing standards-based interoperability among their products. As these vendors sell their wares into corporations large and small, SAML-based federation will be critical to knitting organizations' diverse access-management environments into unified business-to-business supply chains.

So what precisely is SAML 1.0? At its heart, the standard defines XML/Simple Object Access Protocol-based protocol interactions that support real-time authentication and authorization across federated Web services environments. The standard defines request and response messages that security domains use to exchange authentication, attribute and authorization information in the form of trust-assertion messages about named users and resources. Users log on to their home domains through authentication techniques such as ID/password or Kerberos, and this authentication is communicated to a federated destination site through a SAML authentication assertion.

In coming months, SAML-based products will be promoted so aggressively that we'll have to remind ourselves of the standard's immaturity, limited commercial availability and functional constraints. For starters, SAML 1.0 is not yet a ratified OASIS standard and won't likely attain that status until mid- to late summer. In addition, there are few SAML-enabled Web access-management products on the market, though standards-compliant products will become increasingly available over the coming year.

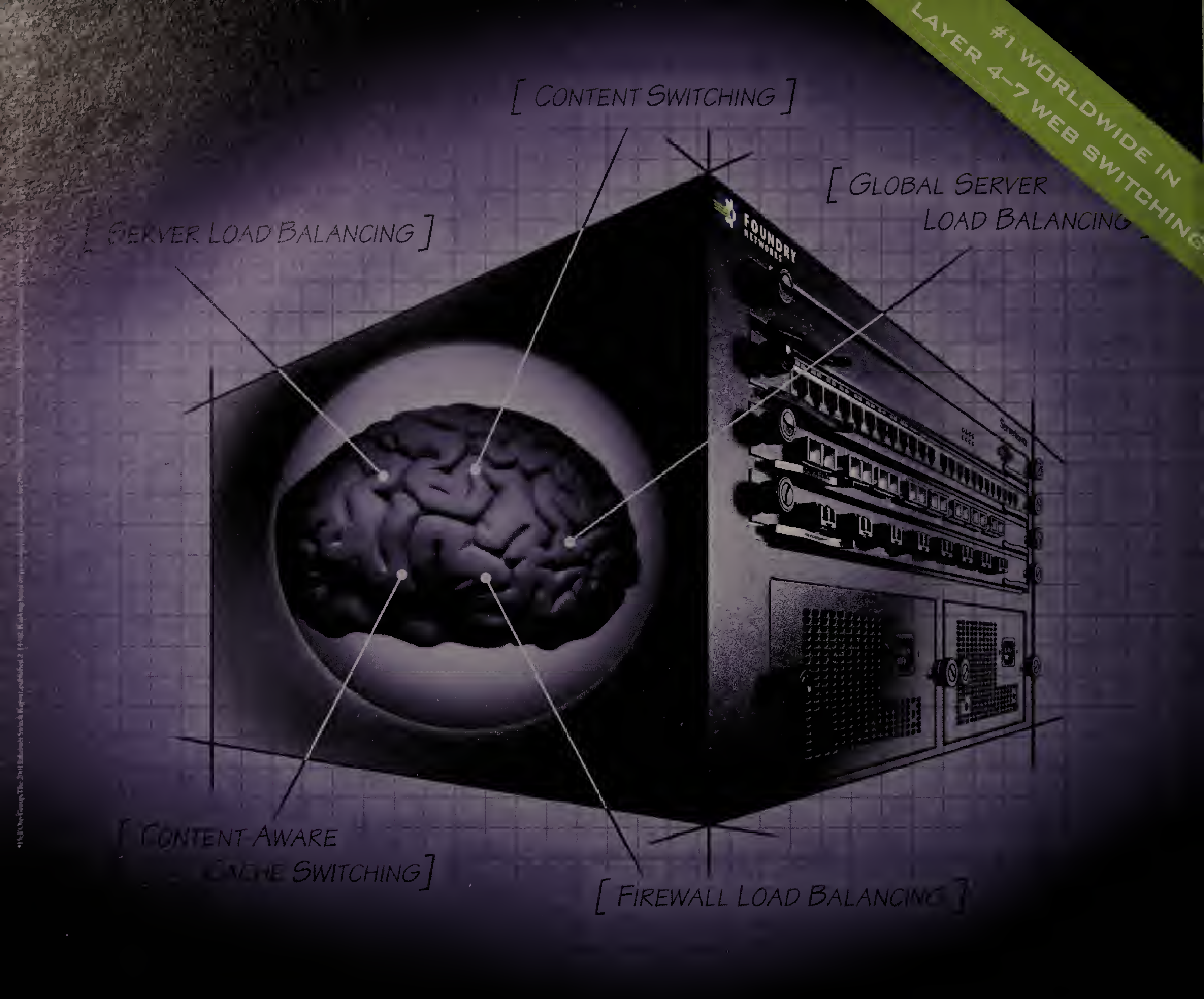
But an even more pressing concern is the need for SAML deployment guidelines. Web access-management vendors will need to help users implement SAML federation profiles without getting lost in the sundry technical options that the standard allows — or doesn't address at all.

During the next several months, Web access-management vendors will address interoperability issues among their SAML 1.0 implementations. If all goes well with initial interoperability testing, expect to see some commercial SAML 1.0-enabled products this year. But it may take several years before SAML-based products mature to the point where users can implement federated single sign-on and authorization scenarios without having to write excessive amounts of custom code to bridge divergent vendor implementations of the core standard.

In any event, we can't afford to ignore SAML. Federation is no fad, and SAML will become a key standard for bridging security domains across Web services environments.

Kobielus is a senior analyst with The Burton Group, an IT advisory service that provides technology analysis for network planners. He can be reached at jkobielus@burtongroup.com. The opinions expressed are his own.

You increasingly will see the term federation used with a new security standard, the XML-based Security Assertions Markup Language (SAML) 1.0 . . . .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NetworkWorld 200

Punched silly in 2001, networking's biggest companies fight to bounce back

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MORE ONLINE

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COVER ILLUSTRATION BY DANIEL ADEL

ONE TOO MANY BOPS?

Remember the bop punching bag toy? It slammed to the ground at the mercy of a fist, then popped up for another round.

So it is with the Network World 200 companies, the biggest public, U.S.-based vendors in the network business. In 2001, they took their punches. Stock values plummeted — BAM! Enterprise users curtailed spending — WHAM! Service providers defaulted on equipment loans — SLAM!

The pounding has meant unprecedented financial losses for them. Cisco posted a $1 billion net loss; Sprint, $1.4 billion; Akamai Technologies, $2.4 billion; Redback Networks, $4.1 billion; Level 3 Communications, $5 billion; i2 Technologies, $7.8 billion; Lucent, $16 billion; and Nortel, $27 billion. In all, 69% posted in the red.

And the worst may be ahead. The Securities and Exchange Commission has been walloping some NW200 companies with inquiries into revenue or debt accounting. Vendors including Computer Associates, EMC, Microsoft, Qwest Communications, Qualcomm and WorldCom have been under such scrutiny so far.

For Qwest, which posted a $4 billion net loss for 2001 and perches near bankruptcy, the SEC's inquiry into how it booked 2000 and 2001 revenue could be the final punch. WorldCom fares little better. Its multimillion-dollar personal loans made to CEO Bernie Ebbers juxtaposed against a $685 million write-off, taken in the third quarter of 2001, for loans deemed noncollectible.

With the Enron debacle so fresh, all this should make enterprise buyers more skittish than ever. Not many will want to patronize vendors with huge losses or questionable accounting tactics. These probes could stall the little industry growth expected this year.

Still, most NW200 companies are as resilient as those bop bags and will right themselves, even under new hits. They continue to cut expenses (albeit to the misfortune of thousands of workers) and sharpen their focus.

Beth Schultz
Editor, Signature Series
Bschultz@nww.com

THE Signature SERIES

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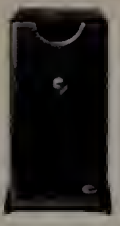

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Bruised and wobbly

THE NETWORK WORLD 200 — THE BIGGEST COMPANIES IN NETWORKING — TOOK IT ON THE CHIN IN 2001. **BY JOHN DIX**

After growing by $100 billion in 1999 and by another $100 billion in 2000, sales for the Network World 200 last year receded for the first time ever, sliding 4% to $890 billion.

And that's the good news. The bad news is the 200 companies — the largest public players in the North American network business — amassed $65 billion in losses in 2001, a staggering $135 billion swing from the $70 billion in profits the group mustered in 2000.

This shouldn't come as too much of a surprise. Nortel alone contributed $27 billion in losses last year. And it had a lot of company. Some 138 of the NW200 ended 2001 in the red.

With sales down and profits in the tank, the stock market naturally wasn't kind, either. The market capitalization of the NW200 was $2 trillion when we captured the data March 22. That's down 35% from $2.7 trillion in 2000 and down a whopping 150% from the halcyon days of 1999 when the NW200 topped $5 trillion.

But 2001 wasn't all gloom and doom. Sixty-two companies managed to generate profits, and a respectable 10% average return at that. Companies weathering the storm well include IBM, Oracle, Sun and local phone giants SBC Communications and Verizon.

Then comes Dell. No one apparently told Dell that things were going from bad to worse. The company drove sales up 26% to $32 billion, a gain that vaulted Dell five rungs up the NW200 ladder, landing it ninth on the list. Dell also squeezed more than $2 billion of profit out of the year, albeit at a steep cost: In two major layoffs, it eliminated nearly 5,700 people, or about 10% of its workforce.

Microsoft only managed to climb one rung, with sales up 10% to $25 billion. But the anticipated whipsaw effect of the soft PC market and its legal imbroglio apparently didn't distract the company from doing what it does best, and that is generate a mountain of profit. No. 13 on the list, Microsoft ranks fourth in total profit at $7.3 billion. This places Microsoft with the biggest NW200 companies, the IBMs and SBCs, which generate two to three times the revenue that Microsoft does.

2001 WASN'T ALL GLOOM AND DOOM. SIXTY-TWO COMPANIES MANAGED TO GENERATE PROFITS, AND A RESPECTABLE 10% AVERAGE RETURN AT THAT.

Hewlett-Packard, much in the news of late, saw sales slide 7% to $45 billion and profit tumble 86% to $408 million, a mere 1% return. That meager profit wouldn't quite offset the $785 million loss Compaq incurred as it was posting sales of $34 billion, down 26% from the previous year.

Add it up in anticipation of what the merged HP/Compaq might look like and you get a $79 billion company with $377 million in losses. Obviously the situation is more complicated than that, but it does show the gargantuan task facing the companies. That $377 million loss is close to the $408 million in profit HP generated in 2001. So together the companies have to recover that, then find that $2 billion in efficiency gains they have been hanging the whole deal on, all while contending with declining market share in key segments.

After all, you don't integrate two product lines and expect to realize the sum of the market share. You have to contend with product and customer overlap. If you execute perfectly and don't leave yourself too exposed to competition during this time, you're lucky if two plus two ends up equaling three.

Dell, IBM and Sun are licking their lips.

While it has been interesting to watch that unfold, the story of the year had to be the twisting fortunes of the once-mighty troika of Cisco, Lucent and Nortel. Go back four years and Cisco was less than half the size of Nortel and about a quarter the size of Lucent (see chart, right). Back then, Cisco's business was different from Lucent's and Nortel's, its path divergent. But in the ensuing years, Nortel bought Bay Networks, Lucent acquired Ascend Communications, Cisco waded into the optical world, and the carriers started shifting to packet infrastructure. Their paths came together.

For now, Cisco has the advantage (see chart, right). It finished the year with revenue up 18% to $22 billion, climbing from No. 17 on the list to 15. Meanwhile, Lucent's sales dropped 26%, bringing it down from No. 9 on the NW200 to 17, and Nortel's sales plummeted 37%, pushing it from 11 to 20.

While a triumph for Cisco, the company doesn't have too much to crow about given it posted a billion-dollar loss for the year. However, even that was something of a feat compared to Nortel's and Lucent's performances.

As noted, Nortel finished the year with an astonishing $27 billion loss on sales of $18 billion. And Lucent posted a $16 billion loss on sales of $21 billion. The two companies accounted for 77% of the $65 billion collective loss the NW200 posted.

In this age of creative reporting practices, many of which are now under Securities and Exchange Commission scrutiny, it is interesting to note that while Cisco lost $1 billion for the year, it reported pro forma net income of $3 billion. It has long advocated use of pro forma numbers to indicate performance because they strip out special one-time charges associated with things such as restructuring costs, stock options and acquisition charges.

But pro forma analysis played better when Cisco was doing an acquisition a minute. It is, after all, hard to acquire 23 companies — as Cisco did in 2000 — and have your books accurately reflect business health. But last year Cisco acquired only two companies, so touting pro forma numbers rings a little hollow, especially in light of the Enron debacle.

As a result of Enron, it will be interesting to see if the industry as a whole starts to back away from things such as pro forma analysis and the reporting of EBITDA (earnings before interest, taxes, depreciation and amortization) numbers.

Write-offs that pro forma analysis typically gloss over are those for "goodwill," the premium paid when acquiring a company for more than the value of its assets. U.S. companies used to be able to spread goodwill charges over 40 years, but rules that went into affect Jan. 1 require U.S. companies to report goodwill changes every year.

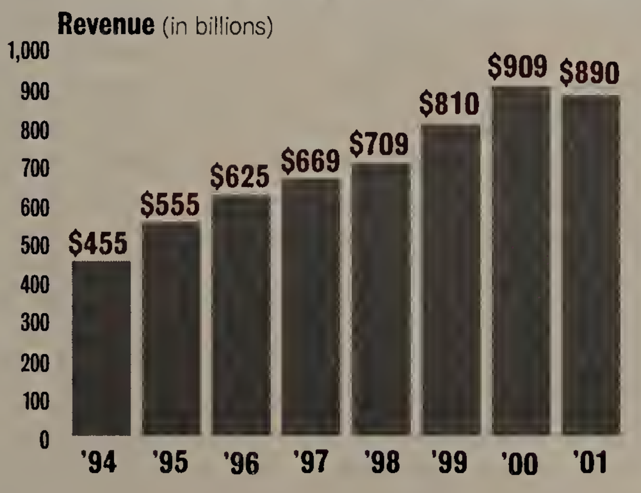
That's going to lead to some outsized write-offs this year, as companies atone for acquisition sins made at the height of the Internet frenzy. Alfred King, vice chairman of Valuation Research, estimates such write-offs will reach $1 trillion.

As an example of how far reaching this is, consider reports indicating that AT&T has $25 billion

See Bruised, page 60

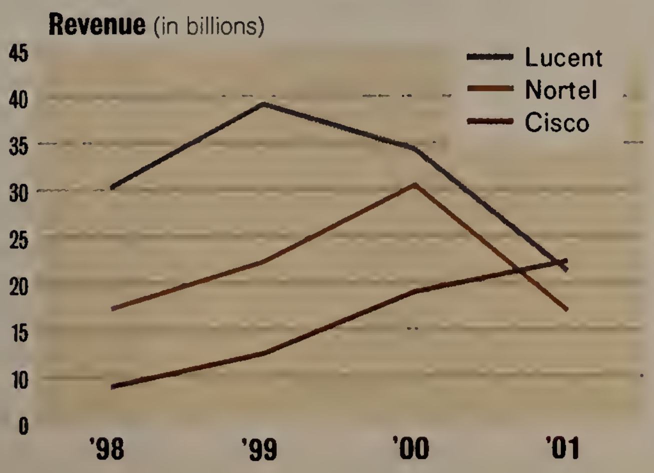
AN NW200 FIRST

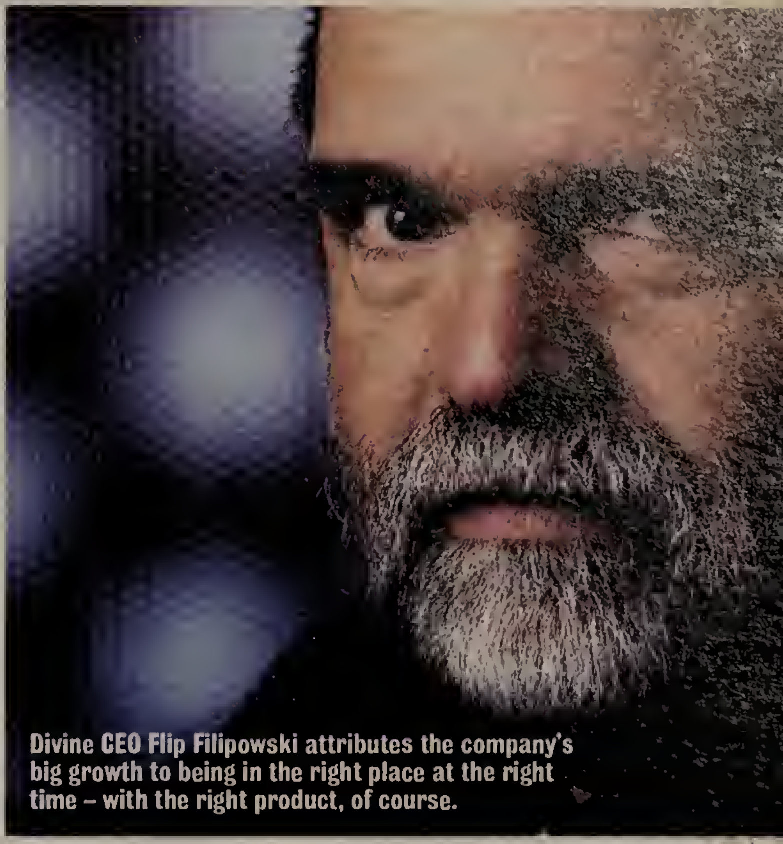
IN ITS EIGHT-YEAR EXISTENCE, THE NW200 HAS NEVER BEFORE DROPPED.



CHANGING FORTUNES

HARD TIMES HAVE ROCKED INDUSTRY PARAGONS, BUT CISCO HAS PLUGGED AHEAD.





Divine CEO Flip Filipowski attributes the company's big growth to being in the right place at the right time – with the right product, of course.

CHRIS LAKE

ON THE GROWTH TRACK

Divine and Peregrine Systems grow the fastest.

In a year when more than 40% of the Network World 200 saw revenues shrink, tripling — or even doubling — revenue is downright amazing. That's the case for this year's two fastest-growing companies (see graphic, page 60).

Collaboration software maker Divine grew fastest overall, stretching revenue 353%. Peregrine Systems grew fastest among those with more than $500 million in revenue with a 123% climb.

Growth is divine

Divine, No. 122 for its entree in the NW200, grew revenue from $44 million in fiscal 2000 to $199.6 million in 2001 by making its "extended enterprise" wares available at the right time and place, says Flip Filipowski, founder and CEO of Divine.

Divine is best known for the enterprise-hardened instant messaging product, MindAlign, which doubles as a persistent message board. But the company offers Web conferencing, content management, campaign management and telephony products along with system integration and application service provider services — all to help companies support applications that they are speedily constructing for customers and suppliers. The events of Sept. 11 also motivated companies to do more collaboration and less travel.

"All of those things converged on us like a perfect storm," Filipowski says.

It also didn't hurt that Divine was flush with cash at a time when competitive start-ups were running dry. Filipowski, well-known as the founder of Platinum Technology, is also an angel investor and venture capitalist. Several of Divine's other executives also came from Platinum, acquired by Computer Associates in 1999 for $3.5 billion.

The young Divine, founded in 1999, already has

See Growth track, page 60

Not surprisingly, Palm employees are so productive thanks to their PDAs, says company CFO Judy Bruner.

DAVID WEINTRAUB

THE PRODUCTIVE PDA

PDA maker Palm nudges out rival Handspring as the most productive NW200 company in 2001.

We all know fanatic members of the PDA religion who incessantly preach how the device saves time. Well, here's a reason to believe: For the second year running, Palm has been the most productive company on the Network World 200, defined by revenue per employee. And the runner-up is rival PDA maker Handspring.

The 1,311 Palm employees produced an impressive $1.2 million apiece in fiscal 2001, as a statistical average. Of course, each of them is issued a free Palm handheld, says Judy Bruner, CFO for the company.

"They quickly come to appreciate that they now can stay connected to their e-mail and company databases and be productive inside and outside the office. Handhelds become more than a perk — they become indispensable," Bruner says.

Bruner also attributes Palm's high productivity to its use of outsourcing and its avoidance of custom coding. "We spend less to implement systems and less to support them," she says.

Last year, Palm topped this list with $1.1 million per employee, with 951 employees.

But high productivity doesn't always mean a healthy bottom line, as Palm's $356.5 million loss for fiscal 2001 put it No. 160 in profit. This in spite of revenue that rose 47%, bumping it from rank 67 to 53. It also didn't save the CEO. Carl Yankowski resigned in November.

Handspring's productivity is nearly as impressive. Its 425 employees each accounted for almost $873,000 in revenue. Handspring was also the second-fastest-growing company on the NW200, growing fiscal 2001 revenue 264% to $370.9 million from $101.9 million. This boosted its rank 73 spots from 170 to 97. Yet, it too saw red, with a $126 million loss.

— Julie Bort

THE FIVE MOST PRODUCTIVE COMPANIES

DETERMINED BY REVENUE PER EMPLOYEE

Rank 2001	Company name	Rev per employee
53	Palm	1,189,397
97	Handspring	872,706
9	Dell	797,200
112	Emulex	768,966
74	Juniper Networks	722,901

NW200 COMPANIES A to Z

2001 rank	Company
38	3Com
191	ACT Teleconferencing
148	Actuate
82	Adaptec
41	ADC Telecommunications
62	Adobe Systems
93	Adtran
35	Agere Systems
24	Agilent Technologies
168	Agile Software
134	Akamai Technologies
26	Alltel
58	American Power Conversion
37	Anixter International
6	AOL Time Warner
32	Apple Computer
91	Ariba
88	Ascential Software
89	Aspect Communications
3	AT&T
21	AT&T Wireless
185	Auspex Systems
28	Avaya
183	Avici Systems
78	8EA Systems
72	8elden
14	8ellSouth
175	BindView Development
181	8lue Martini
55	8MC Software
110	8roadVision
42	8roadwing Communications
85	Brocade Communications
173	Brooktrout
67	Cabletron
164	CacheFlow
166	Captaris
84	Check Point Software
52	Ciena
15	Cisco
81	Citrix Systems
198	Click Commerce
86	Cognos
92	Commerce One
79	Commscope
8	Compaq
33	Computer Associates
128	Computer Network Technology
23	Computer Sciences
47	Compuware
63	Comverse Technology
167	Concord Communications
145	Corel
187	Corio
126	Corvis
160	Critical Path
189	Cylink
149	Datalink
165	Davox
9	Dell
117	Digex
146	Digi International
122	Divine
129	Documentum
182	Dot Hill Systems
199	DSL.net
60	EarthLink
150	EasyLink Services
16	Electronic Data Systems
27	EMC
112	Emulex
153	Entrust
131	Epicor Software
136	Exabyte
188	eXcelon
193	Extended Systems
87	Extreme Networks
158	F5 Networks
101	FileNet
125	Finisar
103	Foundry Networks
152	Frontstep
29	Gateway
64	Genuity
161	Globix
97	Handspring
48	Harris
5	Hewlett-Packard
119	Hummingbird
104	Hypercom
70	i2 Technologies
1	IBM
B0	Infonet Services
123	Inktomi
109	Inrange Technologies
11	Intel
186	Interactive Intelligence
155	Interliant
154	Internap Network Services
115	Internet Security Systems
94	Inter-Tel
106	InterVoice-Brite
120	Interwoven
75	J.D. Edwards
74	Juniper Networks
192	Keynote Systems
139	Legato Systems
54	Level 3 Communications
34	Lexmark International
17	Lucent Technologies
107	Manugistics
195	Marimba
36	Maxtor
179	McAfee.com
99	McData
51	McLeodUSA
147	Mercator Software
98	Mercury Interactive
118	Micromuse
13	Microsoft
10	Motorola
100	MRV Communications
135	MTI Technology
163	NaviSite
31	NCR
169	Netegrity
132	NetIQ
172	NetManage
174	Netopia
157	NetScout Systems
69	Network Appliance
77	Network Associates
142	Network Equipment Technologies
25	Nextel Communications
20	Nortel
68	Novell
13B	Open Text
22	Oracle
190	Packeteer
53	Palm
140	Paradyne Networks
44	PeopleSoft
B3	Peregrine Systems
65	Perot Systems
95	Polycom
137	Printronix
200	Procom Technology
108	Progress Software
170	Proxim
90	PTEK Holdings
39	Qualcomm
59	Quantum
111	Quest Software
18	Qwest Communications
143	Rainbow Technologies
124	RealNetworks
162	Red Hat
114	Redback Networks
116	Research In Motion
105	RSA Security
113	Savvis Communications
4	SBC Communications
40	Scientific-Atlanta
184	Secure Computing
127	SeeBeyond Technology
45	Siebel Systems
180	Sierra Wireless
50	Silicon Graphics
176	SilverStream Software
156	SonicWall
130	Sonus Networks
196	SpeechWorks International
12	Sprint
133	Standard Microsystems
46	Storage Technology
151	StorageNetworks
19	Sun
49	SunGard Data Systems
73	Sybase
96	Sycamore Networks
76	Symantec
57	Symbol Technologies
177	Tarantella
61	Tektronix
43	Tellabs
102	Tibco Software
30	Unisys
194	Verilink
71	VeriSign
56	Veritas Software
141	Verity
2	Verizon
144	Vitria Technology
178	WatchGuard Technologies
171	WebEx Communications
121	webMethods
159	Western Multiplex
66	Williams Communications
7	WorldCom
197	Zoom Technologies

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Network Computing Editor's Choice.*

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NORTEL NETWORKS

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Rank			2001 revenue			2001 profit/loss					2001 Market Cap			Number of employees				
2001	2000	Company Name	$M	'00-'01 % Δ	'97-'01 CAGR	$M	'00-'01 % Δ	% of rev.	Profit Rank	'97-'01 CAGR	$M	Cash & invest $M	Ticker	2001	'00-'01 % Δ	Rev Per Employee	Year Inc.	FY ends
1	1	IBM	85,866	-3%	2%	7,723	-5%	9%	2	5%	181,310	6,330	IBM	319,876	1%	268,435	1911	Dec
2	3	Verizon	67,200	4%	5%	8,200	3%	12%	1	n/m	123,810	18,700	VZ	247,300	-6%	271,735	2000	Dec
3	2	AT&T	52,550	-5%	0%	7,715	65%	15%	3	11%	55,550	10,592	T		u/a		1876	Dec
4	4	SBC Communications	45,908	-11%	1%	7,242	-9%	16%	5	12%	127,110	703	SBC	193,420	-12%	237,349	1984	Dec
5	5	Hewlett-Packard	45,226	-7%	5%	408	-89%	1%	15	-33%	35,260	4,336	HWP	88,000	3%	513,932	1939	Oct
6	28	AOL Time Warner	38,234	6%		(4,921)	n/m	n/m	196	n/m	108,450	719	AOL	89,300	1%	428,152	2001	Dec
7	7	WorldCom	35,179	-10%	37%	1,501	-64%	4%	9	31%	18,100	1	WCOM	61,800	-20%	569,239	1968	Dec
8	6	Compaq	33,554	-21%	6%	(785)	n/m	n/m	175	n/m	18,150	3,874	CPQ	78,200	-17%	429,079	1982	Dec
9	13	Dell	31,888	26%	33%	2,177	31%	7%	8	33%	69,240	5,438	DELL	40,000	10%	797,200	1984	Jan
10	8	Motorola	30,004	-20%	-1%	(3,937)	n/m	n/m	191	n/m	29,890	6,082	MOT		u/a		1928	Dec
11	10	Intel	26,539	-21%	1%	1,291	-88%	5%	11	-29%	205,040	u/a	INTC	83,400	-3%	318,213	1968	Dec
12	18	Sprint	26,071	10%	12%	(1,402)	n/m	n/m	184	n/m	23,810	u/a		83,700	0%	311,481	1899	Dec
13	14	Microsoft	25,296	10%	16%	7,346	-22%	29%	4	16%	327,350	32,524	MSFT	47,600	22%	531,429	1975	Jun
14	12	BellSouth	24,130	-8%	3%	2,570	-39%	11%	6	-5%	69,870	592	BLS	87,875	-15%	274,595	1984	Dec
15	17	Cisco	22,293	18%	28%	(1,014)	n/m	n/m	180	n/m	121,320	4,873	CSCO	37,546	10%	593,752	1984	Jul
16	15	Electronic Data Systems	21,543	12%	7%	1,400	22%	6%	10	14%	30,300	521	EDS	142,000	16%	151,711	1962	Dec
17	9	Lucent	21,294	-26%	3%	(16,198)	n/m	n/m	199	n/m	15,710	2,390	LU	77,000	-39%	276,545	1995	Sep
18	16	Qwest Communications	19,743	19%	95%	(4,010)	n/m	n/m	193	n/m	14,150	242	Q	65,000	-3%	303,738	1984	Dec
19	19	Sun	18,250	16%	16%	927	-50%	5%	13	4%	28,780	1,472	SUNW	43,683	19%	417,783	1982	Jun
20	11	Nortel	17,511	-37%	3%	(27,302)	n/m	n/m	200	n/m	14,070	3,513	NT	53,600	-43%	326,698	1895	Dec
21		AT&T Wireless	13,610	30%	24%	(887)	n/m	n/m	178	n/m	22,700	u/a	AWE		u/a		2001	Dec
22	20	Oracle	10,860	7%	14%	2,561	-59%	24%	7	26%	70,640	4,449	ORCL	42,927	4%	252,988	1977	May
23	22	Computer Sciences	10,524	12%	13%	233	-42%	2%	21	4%	8,340	185	CSC	68,000	17%	154,765	1959	Mar
24		Agilent Technologies	8,396	-10%	5%	174	-77%	2%	25	-20%	15,550	1,170	A	39,000	-17%	215,282	1999	Oct
25	32	Nextel Communications	7,689	35%	51%	(2,885)	n/m	n/m	189	n/m	4,290	3,801	NXTL		u/a		1987	Dec
26	27	Alltell	7,599	5%	9%	1,067	-45%	14%	12	10%	16,550	u/a	AT	23,955	-12%	317,220	1983	Dec
27	23	EMC	7,091	-20%	14%	(508)	n/m	n/m	165	n/m	25,700	u/a	EMC		u/a		1979	Dec
28	25	Avaya	6,793	-12%	1%	352	n/m	n/m	159	n/m	2,070	250	AV	23,000	-26%	295,348	2000	Sep
29	21	Gateway	6,080	-37%	-1%	(1,034)	n/m	n/m	181	n/m	2,090	731	GTW	15,000	-39%	405,333	1985	Dec
30	29	Unisys	6,018	-13%	-2%	(67)	-130%	n/m	126	n/m	4,020	326	UIS	38,900	5%	154,704	1986	Dec
31	31	NCR	5,917	-1%	-2%	142	-38%	2%	27	83%	4,360	336	NCR	30,445	-8%	194,350	1884	Dec
32	24	Apple	5,363	-33%	-5%	(25)	-103%	n/m	105	n/m	8,510	4,336	AAPL	9,612	12%	557,948	1977	Sep
33	30	Computer Associates	4,198	-31%	1%	(591)	-185%	n/m	170	n/m	11,830	1,383	CA	18,200	-13%	230,659	1974	Mar
34	34	Lexmark International	4,140	9%	11%	298	5%	7%	18	15%	7,200	91	LXK	13,000	0%	318,462	1991	Dec
35		Agere Systems	4,080	-13%	8%	(4,616)	n/m	n/m	195	n/m	6,490	u/a	AGR.A	14,400	-13%	283,340		
36		Maxtor	3,797	40%	22%	(646)	n/m	n/m	173	n/m	1,590	380	MXO		u/a		1982	Dec
37	36	Anixter International	3,144	-11%	8%	30	-61%	1%	44	-8%	1,070	27.2	AXE	4,900	-17%	641,633	1957	Dec
38	33	3Com	2,821	-35%	-2%	(965)	-243%	n/m	179	n/m	1,920	1,640	COMS	8,165	-25%	345,487	1979	May
39	39	Qualcomm	2,680	-16%	5%	(549)	n/m	n/m	169	n/m	31,050	2,581	QCOM	6,500	3%	412,277	1985	Sep
40	50	Scientific-Atlanta	2,512	46%	17%	334	114%	13%	16	39%	3,540	754	SFA	8,420	-18%	298,337	1951	Jun
41	38	ADC Telecommunications	2,403	-27%	16%	(1,288)	n/m	n/m	183	n/m	3,150	349	ADCT	12,000	-47%	200,233	1935	Oct
42	45	Broadwing Communications	2,351	15%	24%	(286)	n/m	n/m	154	n/m	1,640	u/a	BRW		u/a		1873	Dec
43	37	Tellabs	2,190	-35%	-1%	(181)	-125%	n/m	147	n/m	4,280	701	TLAB	7,334	-15%	298,609	1975	Dec
44	48	PeopleSoft	2,073	19%	21%	192	32%	9%	24	12%	10,790	434	PSFT	8,436	5%	245,768	1987	Dec
45	47	Siebel Systems	2,048	14%	55%	0	15%	0%	61	n/m	15,110	404	SEBL	7,403	0%	276,699	1993	Dec
46	44	Storage Technology	2,045	-1%	-1%	67	-92%	3%	35	-22%	2,200	453	STK	7,800	3%	262,218	1969	Dec
47	42	Compuware	2,010	-10%	20%	119	-66%	6%	30	4%	4,710	u/a	CPWR	13,220	-14%	152,050	1973	Dec
48	46	Harris	1,955	13%	-12%	21	19%	1%	47	-37%	2,280	103	HRS	10,100	1%	193,574	1895	Jun
49	51	SunGard Data Systems	1,929	16%	13%	246	16%	13%	20	22%	9,180	396	SDS		u/a		1982	Dec
50	41	Silicon Graphics	1,855	-20%	-13%	(493)	-41%	n/m	163	n/m	854	123	SGI	5,956	-11%	311,367	1982	Jun
51	57	McLeodUSA[1]	1,811	30%	47%	(3,595)	n/m	n/m	190	n/m		152	MCLD		u/a		1991	Dec
52	75	Ciena	1,603	87%	31%	(1,794)	n/m	n/m	186	n/m	2,820	398	CIEN	3,778	36%	424,352	1992	Oct
53	67	Palm	1,559	47%	69%	-357	n/m	n/m	160	n/m	2,230	514	PALM	1,311	38%	1,189,397	1992	May
54	61	Level 3 Communications	1,533	29%	36%	(4,978)	n/m	n/m	197	n/m	1,400	1,297	LVLT	4,527	-27%	338,635	1985	Dec
55	49	BMC Software	1,504	-13%	22%	42	-83%	3%	39	-24%	4,490	291	BMC	7,330	9%	205,211	1980	Mar
56	60	Veritas Software	1,492	24%	65%	(651)	n/m	n/m	174	n/m	16,910	1,695	VRTS	5,605	17%	266,244	1989	Dec
57	55	Symbol Technologies	1,453	0%	13%	(54)	-22%	n/m	121	n/m	2,540	81	SBL	5250	-13%	276,705	1973	Dec
58	53	American Power Conversion	1,433	-3%	10%	115	-31%	8%	31	-1%	2,900	393	APCC	6,210	-16%	230,805	1981	Dec
59	56	Quantum	1,406	-1%	-23%	161	294%	11%	26	2%	1,210	398	DSS	3,200	-49%	439,313	1980	Mar
60	70	EarthLink	1,245	26%	56%	(341)	n/m	n/m	158	n/m	1,450	u/a	ELNK	7,377	u/a	168,754	1994	Dec
61	65	Tektronix	1,235	10%	-9%	140	-60%	11%	28	4%	2,110	u/a	TEK	4904	15%	251,896	1946	May
62	58	Adobe Systems	1,230	-3%	6%	206	-29%	17%	23	2%	9,410	219	ADBE	3,029	1%	405,976	1982	Nov
63	59	Comverse Technology	1,225	40%	34%	249	46%	20%	19	42%	2,420	1,275	CMVT	6,370	34%	192,323	1984	Jan
64	63	Genuity	1,221	7%	46%	(3,960)	-518%	324%	192	n/m	248	u/a	GENU		u/a		2000	Dec
65	66	Perot Systems	1,205	9%	9%	(3)	n/m	n/m	69	n/m	2,010	259	PER	8,100	4%	148,728	1988	Dec
66	76	Williams Communications	1,186	41%	37%	(1,184)	n/m	n/m	182	n/m	0	u/a	WCG		u/a		1998	Dec
67	54	Cabletron[2]	1,072	-27%	-5%	(606)	n/m	n/m	171	n/m		u/a		3845	u/a	278,674		

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[1] McLeodUSA is currently in Chapter 11, but expects to emerge and continue operations.

[2] In fiscal year 2001 Enterysis Networks and riverstone Networks were part of Cabletron. Cabletron ceased operating as a separately traed company in August, 2001.

n/m = Not measurable u/a = Unavailable at press time

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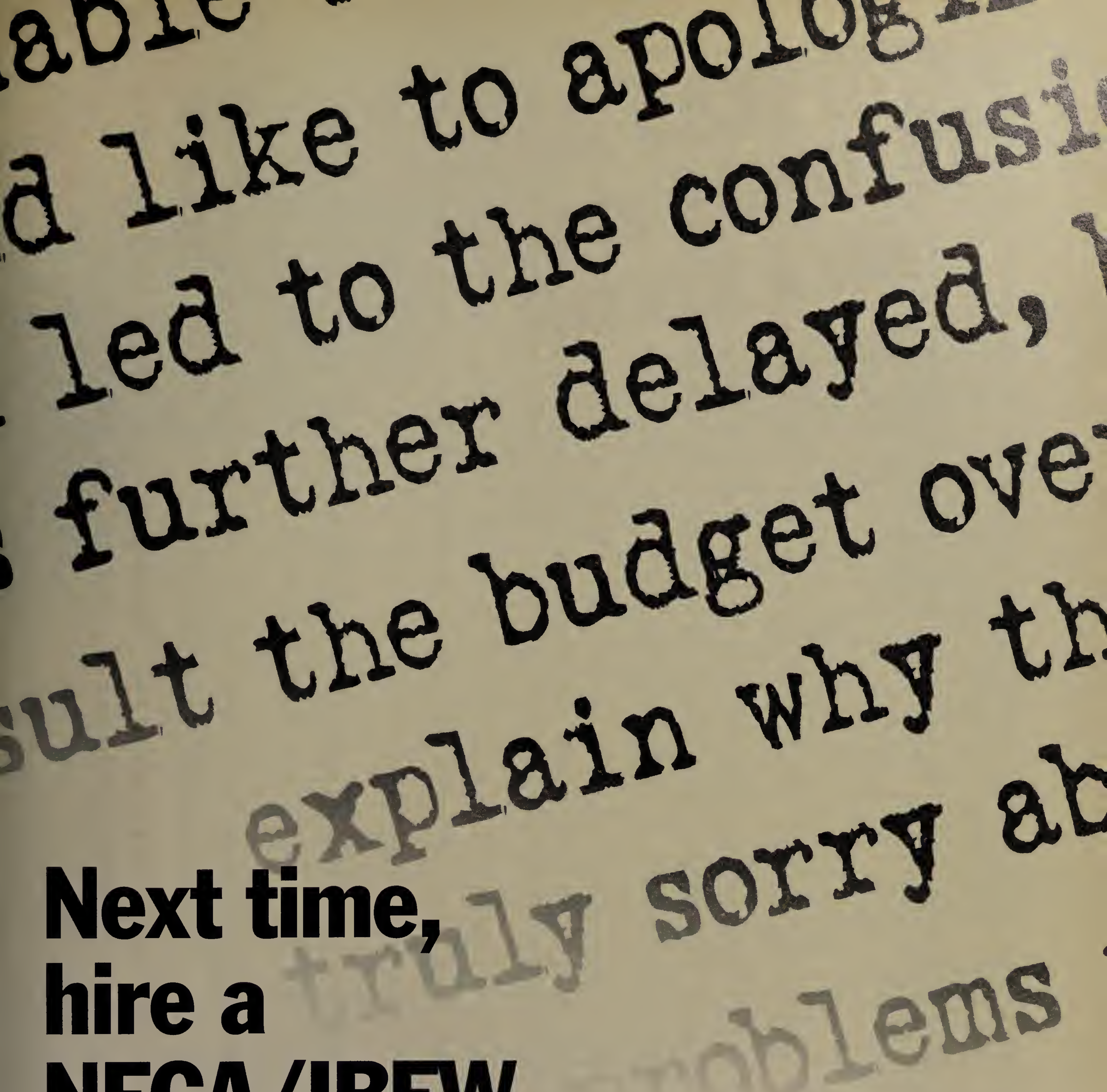
Rank			2001 revenue			2001 profit/loss					2001 Market Cap			Number of employees				
2001	2000	Company Name	$M	'00-'01 % Δ	'97-'01 CAGR	$M	'00-'01 % Δ	% of rev.	Profit Rank	'97-'01 CAGR	$M	Cash & invest $M	Ticker	2001	'00-'01 % Δ	Rev Per Employee	Year Inc.	FY Ends
68	62	Novell	1,040	-10%	1%	14	-72%	1%	52	n/m	1,350	705	NOVL	6,521	33%	159,500	1983	Oct
69	86	Network Appliance	1,006	74%	61%	75	1%	7%	34	n/m	6,800	272	NTAP	2,403	64%	418,727	1992	Apr
70		i2 Technologies	986	-12%	35%	(7,751)	n/m	n/m	198	n/m	2,450		ITWO		u/a		1988	Dec
71	88	VeriSign	984	107%	153%	233	80%	24%	22	n/m	6,470	925	VRSN	3,271	43%	300,703	1995	Dec
72	64	Belden	940	-17%	7%	31	-41%	3%	43	-11%	608	3	BWC	5,000	-17%	188,000	1902	Dec
73	71	Sybase	926	2%	0%	97	34%	10%	33	n/m	1,700	287	SY		u/a		1984	Dec
74	83	Juniper Networks	887	32%		(13)	n/m	n/m	86	n/m	3,940	990	JNPR	1,227	32%	722,901	1996	Dec
75	69	J.D. Edwards	874	-13%	6%	(180)	n/m	n/m	146	n/m	2,150		JDEC	4,713	-7%	185,445	1977	Oct
76	80	Symantec	854	14%	14%	64	-62%	7%	37	20%	5,940	557	SYMC	3,800	46%	224,632	1982	Mar
77	81	Network Associates	835	12%	3%	(101)	n/m	n/m	137	n/m	3,400	749	NETA	3,659	6%	228,068	1989	Dec
78	90	BEA Systems	820	77%	68%	17	-186%	2%	51	n/m	5,940	941	BEAS	3,000	58%	273,267	1995	Jan
79	72	Commscope	739	-22%	4%	35	-59%	5%	41	-1%	896	62	CTV	3,100	-23%	238,226	1953	Dec
80	87	Infonet Services	662	37%	20%	27	-202%	4%	45	n/m	990	138	IN	943	10%	701,957	1980	Mar
81	89	Citrix Systems	592	26%	37%	105	11%	18%	32	21%	3,350	747	CTXS	1,880	35%	314,681	1989	Dec
82	78	Adaptec	582	-21%	-9%	40	-77%	7%	40	-18%	1,250	208	ADPT	1,943	-23%	299,537	1981	Mar
83	119	Peregrine Systems	565	123%	74%	(852)	n/m	n/m	177	n/m	1,860	209	PRGN	2,956	106%	191,035	1981	Mar
84	94	Check Point Software	528	24%	45%	322	46%	61%	17	52%	7,390	219	CHKP	1,178	7%	447,878	1993	Dec
85	105	Brocade Communications	513	56%	127%	3	-96%	1%	60	n/m	6,050	150	BRCD	1,066	76%	481,238	1995	Oct
86	100	Cognos	496	29%	20%	64	9%	13%	36	12%	2,510		COGN	2,704	26%	183,321	1969	
87	118	Extreme Networks	491	87%	339%	(69)	n/m	n/m	127	n/m	1,180	157	EXTR	970	43%	506,392	1996	Jun
88		Ascential Software	481	-48%	-6%	625	-734%	130%	14	n/m	1,080	759	ASCL		u/a			Dec
89	85	Aspect Communications	449	-24%	3%	(152)	n/m	n/m	144	n/m	203	135	ASPT		u/a		1985	Dec
90	93	Ptek Holdings	423	-3%	13%	(242)	n/m	n/m	152	n/m	190	23	PTEK		u/a		1991	Dec
91	115	Ariba	409	47%	248%	(88)	n/m	n/m	135	n/m	1,230	261	ARBA	1,124	12%	363,701	1996	Sep
92	98	Commerce One	409	2%	199%	(2,584)	n/m	n/m	188	n/m	502	289	CMRC		u/a		1994	Dec
93	91	Adtran	387	-16%	8%	17	-86%	4%	50	-16%	981	108	ADTN	1,694	-2%	228,512	1985	Dec
94	97	Inter-Tel	386	-4%	12%	13	-145%	3%	53	-2%	439	62	INTL		u/a		1969	Dec
95	104	Polycom	383	16%	50%	(28)	n/m	n/m	108	n/m	2,410	127	PLCM	1,269	136%	301,970	1990	Dec
96	131	Sycamore Networks	375	89%		(280)	n/m	n/m	153	n/m	1,040	1,249	SCMR	944	37%	396,928	1998	Jul
97	170	Handspring	371	264%		(126)	n/m	n/m	143	n/m	720		HAND	425	65%	872,706	1998	Jun
98	108	Mercury Interactive	361	18%	36%	54	-16%	15%	38	52%	3,110	428	MERQ		u/a		1989	Dec
99	121	McData	344	38%	60%	(9)	n/m	n/m	78	n/m	1,330	216	MCDTA	886	46%	388,713	1982	Dec
100	107	MRV Communications	333	4%	15%	(326)	n/m	n/m	157	n/m	241	165	MRVC		u/a		1988	Dec
101	99	FileNet	333	-17%	6%	(17)	n/m	n/m	88	n/m	625	172	FILE	1,754	4%	189,567	1982	Dec
102	120	Tibco Software	319	27%	55%	(13)	n/m	n/m	84	n/m	2,300	677	TIBX	1,006	8%	317,396	1997	Nov
103	101	Foundry Networks	311	-17%	147%	3	-97%	1%	59	n/m	853		FDRY		u/a		1996	Dec
104	106	Hypercom	292	-11%	8%	(20)	n/m	n/m	93	n/m	219		HYC		u/a		1978	Dec
105	114	RSA Security	283	1%	15%	(3)	n/m	n/m	68	n/m	545	62	RSAS		u/a		1984	Dec
106	112	InterVoice-Brite	275	-4%	21%	(2)	n/m	n/m	67	n/m	209	16	INTV	1,196	-13%	229,682	1983	Feb
107	147	Manugistics Group	268	76%	22%	(28)	n/m	n/m	109	n/m	1,270	300	MANU	1,451	68%	184,700	1969	Feb
108	117	Progress Software	262	-3%	7%	18	-48%	7%	49	13%	640	175	PRGS	1,395	0%	187,814	1981	Nov
109		Inrange Technologies	261	12%	4%	(18)	n/m	n/m	90	n/m	782	17	INRG		u/a			Dec
110	96	BroadVision	248	-40%	56%	(833)	n/m	n/m	176	n/m	568	171	BVSN		u/a		1993	Dec
111	141	Quest Software	245	48%	68%	(56)	n/m	n/m	122	n/m	1,480	30	QSFT	1,800	26%	136,333	1987	Dec
112	152	Emulex	245	76%	31%	(24)	n/m	n/m	100	n/m	2,570	37	EMLX	319	99%	768,966	1979	Jun
113		Savvis Communications	243	30%	144%	(289)	-275%	119%	155	n/m	73	32	SVVS	570	-3%	426,316	1995	Dec
114	116	Redback Networks	228	-18%		(4,118)	n/m	n/m	194	n/m	573	31	RBAK		u/a		1996	Dec
115	133	Internet Security Systems	224	15%	54%	(16)	n/m	n/m	87	n/m	1,240	163	ISSX	1,205	2%	185,560	1994	Dec
116	180	Research In Motion	221	160%	98%	(6)	n/m	n/m	75	n/m	2,060	509	RIMM	1,400	175%	158,071	1984	Feb
117	139	Digex	214	28%	79%	(189)	n/m	n/m	148	n/m	82		DIGX		u/a		1999	Dec
118	160	Micromuse	213	72%	87%	21	-1165%	10%	48	n/m	629	176	MUSE	742	44%	286,388	1997	Sep
119	124	Hummingbird	208	-12%	16%	4	-64%	2%	56	-33%	422	94	HUMC		u/a		1984	Sep
120	159	Interwoven	203	53%	313%	(4)	n/m	n/m	72	n/m	546	221	IWOV	918	3%	220,806	1995	Dec
121		webMethods	202	235%		132	318%	65%	29	n/m	943	71	WEBM	1,018	269%	198,330	1996	Mar
122		Divine	200	353%		(370)	n/m	n/m	161	n/m	234		DVIN		u/a		1999	Dec
123	128	Inktomi	199	-11%		(297)	n/m	n/m	156	n/m	620	85	INKT	774	-11%	256,589	1996	Sep
124	123	RealNetworks	189	-22%	39%	(75)	n/m	n/m	130	n/m	1,160	345	RNWK	807	-23%	234,077	1994	Dec
125		Finisar	189	181%	86%	(85)	n/m	n/m	133	n/m	1,510		FNSR	760	202%	248,421		Apr
126		Corvis	189	174%		(1,449)	n/m	n/m	185	n/m	485	639	CORV	863	-41%	218,424		Dec
127		SeeBeyond Technology	187	63%	48%	(5)	n/m	n/m	73	n/m	683	47	SBYN	718	-7%	260,585	1989	Dec
128	138	Computer Network Technology	187	6%	18%	(4)	n/m	n/m	71	n/m	396		CMNT		u/a		1983	Jan
129	132	Documentum	186	-6%	20%	(38)	n/m	n/m	115	n/m	976	88	DCTM	900	1%	206,333	1990	Dec
130		Sonus Networks	173	235%		(645)	n/m	n/m	172	n/m	626	49	SONS	593	41%	292,074	1997	Dec
131	130	Epicor Software	171	-22%	24%	(29)	n/m	n/m	110	n/m	102		EPIC		u/a		1984	Dec
132		NetIQ	167	248%	236%	(524)	n/m	n/m	167	n/m	1,300	467	NTIQ	1,091	104%	152,979		Jun
133	146	Standard Microsystems	163	7%	-14%	27	477%	16%	46	n/m	369	100	SMSC	459	10%	355,991	1971	Feb
134	176	Akamai Technologies	163	82%		(2,435)	n/m	n/m	187	n/m	491	79	AKAM	841	-35%	194,055	1998	Dec

n/m = Not measurable n/a = Unavailable at press time



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National Electrical Contractors Association
International Brotherhood of Electrical Workers

Rank			2001 revenue			2001 profit/loss					2001 Market Cap			Number of employees				
2001	2000	Company Name	$M	'00-'01 % Δ	'97-'01 CAGR	$M	'00-'01 % Δ	% of rev.	Profit Rank	'97-'01 CAGR	$M	Cash & invest $M	Ticker	2001	'00-'01 % Δ	Rev Per Employee	Year Inc.	FY Ends
135	126	MTI Technology	162	-29%	1%	(36)	n/m	n/m	113	n/m	33	16	MTIC	554	-19%	291,877	1987	Mar
136	129	Exabyte	158	-29%	-14%	(36)	n/m	n/m	112	n/m	19		EX8T		u/a		1985	Dec
137	135	Printronix	158	-17%	-2%	(1)	n/m	n/m	64	n/m	70		PTNX	903	-11%	175,083	1974	
138	165	Open Text	148	31%	46%	11	-57%	7%	54	n/m	528	88	OTEX	1,150	182%	128,435	1991	Jun
139	125	Legato Systems	148	1%	13%	(82)	n/m	n/m	132	n/m	858	146	LGTO	1,338	5%	110,239	1988	Dec
140	122	Paradyne Networks	147	-41%	-4%	(24)	n/m	n/m	101	n/m	121	38	PDYN	600	-31%	244,500	1969	Dec
141	172	Verity	145	51%	28%	34	2%	23%	42	23%	600	139	VRTY	524	44%	276,718	1988	May
142	127	Network Equipment Technologies	144	-36%	-15%	(21)	n/m	n/m	95	n/m	118	21	NWK	542	-36%	266,236	1983	Mar
143	142	Rainbow Technologies	137	-16%	8%	(24)	n/m	n/m	99	n/m	262	29	RNBO		u/a		1984	Dec
144	155	Vitria Technology	135	0%	106%	(54)	n/m	n/m	120	n/m	588	157	VITR		u/a			Dec
145	145	Corel	134	-15%	-12%	(7)	n/m	n/m	77	n/m	130	25	CORL	889	11%	151,069	1985	Nov
146	157	Digi International	130	-2%	-5%	(2)	n/m	n/m	66	n/m	119	30	DGII	425	-17%	306,824	1989	Sep
147	153	Mercator Software	126	-9%	36%	(64)	n/m	n/m	124	n/m	182	28	MCTR	614	-7%	205,700	1985	Dec
148		Actuate	125	16%	67%	(6)	n/m	n/m	76	n/m	401	35	ACTU	609	5%	205,255	1993	Dec
149	154	Datalink	125	-10%	12%	(505)	n/m	n/m	164	n/m	52	6	DTLK	216	12%	577,315	1958	Dec
150	196	EasyLink Services	124	102%	262%	(206)	n/m	n/m	149	n/m	30		EASY		u/a			Dec
151		StorageNetworks	124	156%		(225)	n/m	n/m	151	n/m	370	44	STOR	400	-31%	309,000	1998	Dec
152		Frontstep	118	-8%	12%	(25)	n/m	n/m	104	n/m	25		FSTP	680	-22%	173,971		Jun
153	150	Entrust Technologies	118	-20%	36%	(544)	n/m	n/m	168	n/m	328	149	ENTU	792	-29%	148,864	1996	Dec
154	190	Internap Network Services	117	0.68652	159%	(479)	n/m	n/m	162	n/m	116	82	INAP		u/a			Dec
155	143	Interliant	117	4069		(172)	n/m	n/m	145	n/m	13		INIT		u/a		1997	Dec
156	191	SonicWall	112	-26%	64%	(21)	n/m	n/m	96	n/m	922		SNWL		u/a			
157	179	NetScout Systems	108	61%	29%	4	-76%	3%	57	-9%	197	61	NTCT	364	47%	296,429	1984	Mar
158	167	F5 Networks	107	25%	252%	(31)	n/m	n/m	111	n/m	657	70	FFIV	493	-1%	217,850	1996	Sep
159		Western Multiplex	106	-1%	27%	(26)	n/m	n/m	106	n/m	141	17	WMUX	270	16%	391,481	1979	Dec
160		Critical Path	104	0%		(80)	n/m	n/m	131	n/m	186	69	CPTH	562	-46%	185,409	1997	Dec
161	183	Globix	104	-23%	43%	(213)	n/m	n/m	150	n/m	6		GBIX	600	u/a	173,667	1989	Sep
162		Red Hat	103	28%	3%	(87)	n/m	n/m	134	n/m	1,010	148	RHAT	735	69%	140,680	1994	Feb
163		NaviSite	103	60%	98%	(123)	n/m	n/m	141	n/m	19	22	NAVI	386	-18%	266,062		Jul
164		CacheFlow	98	106%		(519)	n/m	n/m	166	n/m	47	55	CFLO	496	62%	196,976	1996	Apr
165	173	Davox	94	233%	2%	(1)	n/m	n/m	65	n/m	105		DAVX		u/a		1981	Dec
166	171	Captaris	92	0%	10%	(12)	n/m	n/m	83	n/m	110	13	CAPA	515	6%	178,447	1982	Dec
167	174	Concord Communications	88	-9%	33%	(11)	n/m	n/m	82	n/m	368	68	CCRD	471	4%	186,837	1980	Dec
168		Agile Software	87	-4%	128%	(125)	n/m	n/m	142	n/m	584		AGIL	460	59%	189,348		Apr
169		Netegrity	87	170%	79%	5	78%	6%	55	n/m	554	103	NETE	486	25%	178,189	1986	Dec
170	168	Proxim	86	130%	15%	(108)	n/m	n/m	138	n/m	141	49	PROX	236	-32%	362,288	1984	Dec
171		WebEx Communications	81	-20%	129%	(28)	n/m	n/m	107	n/m	618	42	WEBX		u/a			Dec
172	169	NetManage	80	217%	5%	(9)	n/m	n/m	81	n/m	54	34	NETM	470	-29%	170,213	1990	Dec
173	151	Brooktrout	80	-23%	3%	(3)	n/m	n/m	70	n/m	79	26	BRKT	349	-7%	228,653	1984	Dec
174	175	Netopia	77	-44%	31%	(43)	n/m	n/m	117	n/m	89	49	NTPA	329	0%	234,954	1986	Sep
175	178	BindView	71	-14%		(24)	n/m	n/m	102	n/m	107	43	BVEW	740	-1%	95,811	1990	Dec
176	184	SilverStream Software	68	-18%	221%	(115)	n/m	n/m	139	n/m	111	87	SSSW		u/a			Dec
177		Tarantella	67	-16%	-19%	(6)	n/m	n/m	74	n/m	19	14	TTLA	201	-78%	331,841	1978	Sep
178	198	WatchGuard Technologies	64	-55%	66%	(37)	n/m	n/m	114	n/m	177	14	WGRD	250	-13%	257,200	1996	Dec
179		McAfee.com	62	194%	90%	(1)	n/m	n/m	63	n/m	908	65	MCAF	184	15%	336,957	1998	Dec
180		Sierra Wireless	60	32%	45%	(25)	n/m	n/m	103	n/m	171	12	SWIR		u/a		1993	Dec
181	187	Blue Martini Software	57	12%		(70)	n/m	n/m	128	n/m	97	96	BLUE		u/a			Dec
182	162	Dot Hill Systems	56	-23%	-4%	(43)	n/m	n/m	116	n/m	69	17	HIL	233	-44%	241,631	1988	Dec
183		Avici Systems	53	-54%		(96)	n/m	n/m	136	n/m	118	127	AVCI		u/a		1996	Dec
184		Secure Computing	53	254%	2%	(9)	n/m	n/m	80	n/m	548	16	SCUR		u/a			Dec
185	182	Auspex Systems	52	35%	-24%	(44)	n/m	n/m	118	n/m	66	31	ASPX	400	27%	129,750	1987	Jun
186		Interactive Intelligence	50	-37%	99%	(9)	n/m	n/m	79	n/m	80	15	ININ	385	10%	130,130	1994	Dec
187		Corio	50	30%		(64)	n/m	n/m	125	n/m	65		CRIO		u/a		1998	Dec
188		eXcelon	49	14%	1%	(60)	n/m	n/m	123	n/m	84		EXLN		u/a			Dec
189	192	Cylink	49	-30%	0%	(20)	n/m	n/m	94	n/m	57		CYLK		u/a		1983	Dec
190		Packeteer	47	-29%	102%	(71)	n/m	n/m	129	n/m	185	50	PKTR	192	5%	243,229	1996	Dec
191		ACT Teleconferencing	47	14%	36%	(1)	n/m	n/m	62	n/m	44	7	ACTT		u/a		1990	Dec
192		Keynote Systems	46	24%	124%	3	-27%	7%	58	n/m	261	337	KEYN	260	6%	175,385	1996	Sep
193		Extended Systems	45	35%	3%	(23)	n/m	n/m	98	n/m	64		XTND		u/a			Jun
194	193	Verilink	45	-20%	-5%	(23)	n/m	n/m	97	n/m	8	15	VRLK	201	-8%	223,881	1982	Jun
195		Marimba	44	-34%	51%	(13)	n/m	n/m	85	n/m	75	61	MR8A	212	-19%	20.8	1996	Dec
196		SpeechWorks International	44	0%	85%	(47)	n/m	n/m	119	n/m	263	56	SPWX	409	29%	10.7	1994	Dec
197		Zoom Technologies	44	46%	-7%	(18)	n/m	n/m	91	n/m	9	5	ZOOM		u/a		1977	Dec
198		Click Commerce	43	-27%	102%	(17)	n/m	n/m	89	n/m	58	41	CKCM		u/a		1996	Dec
199		DSL.net	42	19%		(116)	n/m	n/m	140	n/m	51	20	DSLN	187	-51%	22.5	1998	Dec
200	194	Procom Technology	42	136%	-17%	(19)	n/m	n/m	92	n/m	26	25	PRCM	211	-13%	19.9	1987	Jul
				-34%														

n/m = Not measurable n/a = Unavailable at press time

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On February 22, 2002, **Secure Computing and Network Associates entered into a purchase agreement for Secure to acquire the Gauntlet™ product line.** Network Associates has decided to streamline their product line and focus on their core business. For Gauntlet, their widely used application firewall product, they set out to find a buyer who had experience selling and supporting enterprise security products, and the infrastructure and know-how to properly support Gauntlet's worldwide user base.

As the leading provider of high-end, ultra-secure, application firewalls to enterprise accounts, **Secure Computing was an ideal candidate for Network Associates to approach**. Secure Computing has been dedicated to selling and supporting Sidewinder™, the industry's most secure enterprise firewall, for over seven years. **As such, Secure Computing already has the complete support infrastructure in place to properly handle this Gauntlet transition.**

We at Secure Computing are delighted to have the opportunity to acquire the Gauntlet product along with other Gauntlet-related assets in this transaction. **Secure Computing's purchase of Gauntlet will further solidify our position as the industry's leading supplier of enterprise firewalls.** Secure Computing is committed to working with firewall and VPN customers. **Ultimately, we plan to build upon Gauntlet and Sidewinder technologies to develop the most comprehensive hybrid architecture firewall in the marketplace.** Our long-term goal is that *all* customers reap the benefits of this acquisition with best-of-breed technology solutions.

To find out more about Secure Computing's purchase of Gauntlet or for questions about support or software licensing, please contact (800) 379-4944 or e-mail us at *sales@securecomputing.com.*

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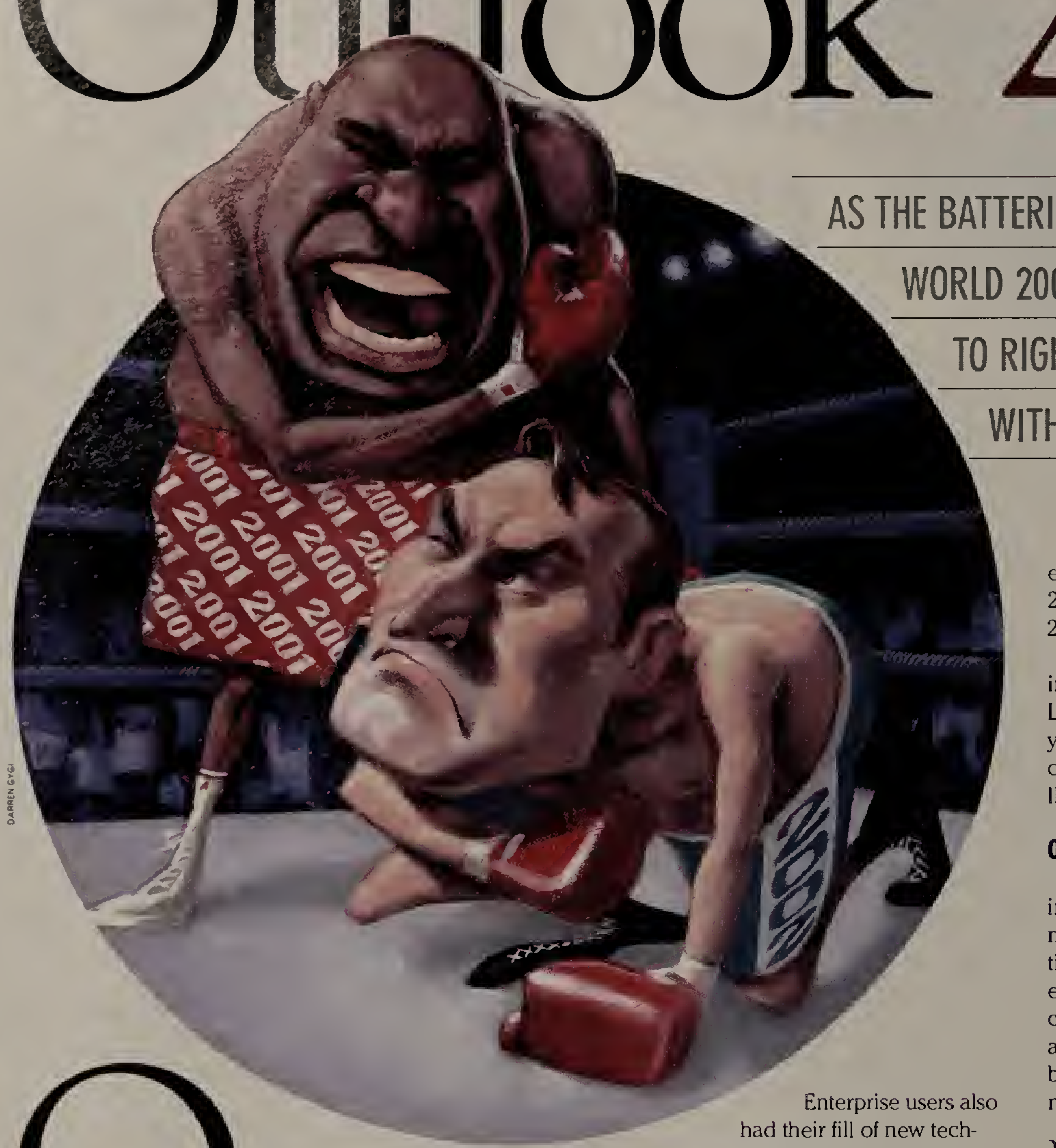


DARREN GYGI

AS THE BATTERING OF 2001 EASES, NETWORK WORLD 200 COMPANIES ARE STRUGGLING TO RIGHT THEMSELVES AND GET ON WITH BUSINESS.

BY JULIE BORT

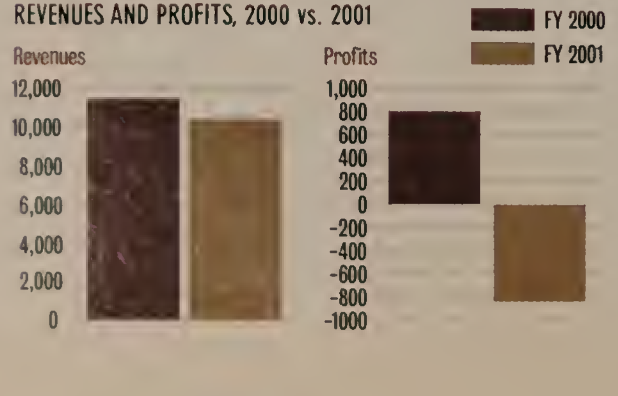
Our annual forecast for the year shows resiliency among the infrastructure, enterprise applications and service provider segments, although some markets will revive faster than other.s.

Outlook: Infrastructure

For infrastructure vendors, success is a two-edged sword. With affordable 10/100 Ethernet the enterprise mainstay, Gigabit Ethernet is not much in play. As a percentage of the total market, and ports, Gigabit Ethernet has been flat, reports Seamus Crehan, senior analyst for Dell'Oro Group.

NW200 INFRASTRUCTURE VENDORS

REVENUES AND PROFITS, 2000 vs. 2001



Enterprise users also had their fill of new technologies such as VPNs during the Internet boom. Integration and incremental efficiencies, not new devices, are what they want now.

"Through 2000, we had a series of continuous seamless upgrades that made it look like one big upgrade cycle," Crehan says. "We have absolutely no compelling new technology to break through that cycle."

In 2001, that resulted in a 66% revenue fall-off for NW200 infrastructure companies. And 75% lost money. Wiring closet vendors, such as 3Com, Avaya, Cabletron (Enterasys Networks) and Nortel, were hit particularly hard. Extreme Networks drove revenue up 87%, yet lost nearly $69 million.

Revenue for the market's foundation, Ethernet switches, will be nearly flat, inching to $11.4 billion in 2002 from the $11.3 billion posted in 2001. That's a 10% decline over 2000, according to Dell'Oro.

Worldwide revenues for other hardware — servers, workstations and RAID storage — will decline by at least 9% this year to a high of no more than $20 billion, Gartner says.

Still, Gigabit Ethernet, especially the new gigabit-over-copper products, will sell eventually. IDC estimates gigabit-over-copper ports to reach about 10 million in 2002 and 55.6 million in 2004.

Also on the uptick will be enterprise investment in Web switches, caching devices and other hardware for content delivery networks (CDN). IDC expects companies to spend $960.2 million in 2002 building CDN as a core network service. By 2005, they will spend almost $3.6 billion, it says.

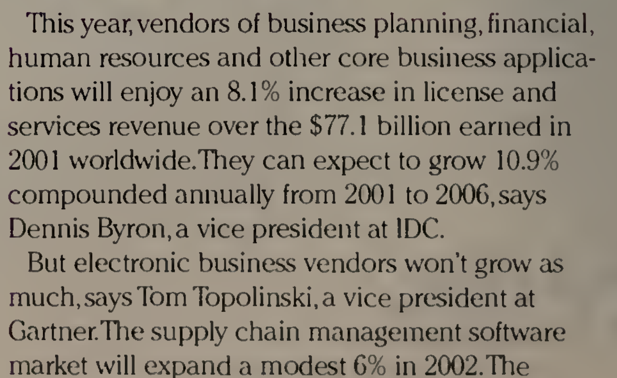
The growing use of streaming media for e-learning and video meetings will drive CDN, says Lawrence Orans, senior analyst for Gartner. "In five years, video to the desktop will happen. Video over IP will happen more quickly than voice over IP," Orans predicts.

Outlook: Enterprise applications

Enterprise software vendors on the NW200 increased revenue by 5% in fiscal 2001, or $76.8 million, but still lost $64.6 million. Yet these tough times are only a speed bump. Market watchers expect demand to grow steadily for mission-critical enterprise applications over the next five years and beyond. But, software once called the next big thing, such as customer relationship management (CRM), may not blossom as predicted.

NW200 ENTERPRISE SOFTWARE VENDORS

REVENUES AND PROFITS, 2000 vs. 2001



This year, vendors of business planning, financial, human resources and other core business applications will enjoy an 8.1% increase in license and services revenue over the $77.1 billion earned in 2001 worldwide. They can expect to grow 10.9% compounded annually from 2001 to 2006, says Dennis Byron, a vice president at IDC.

But electronic business vendors won't grow as much, says Tom Topolinski, a vice president at Gartner. The supply chain management software market will expand a modest 6% in 2002. The enterprise resource planning sector will see revenues dip 10% in 2002. And CRM software market, now known to have high project failure rates, has vastly reduced growth projections. By early 2001, Gartner dropped its revenue growth estimates

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from 80% to 12%. Now the best prediction for 2002, by AMR Research, is 21%, with Gartner asserting revenue will stay flat, at about $3.7 billion in 2002.

"Spending is going to be under totally different expectations and a lot more scrutiny than it was in 1997-2000. During what we call the 'hype cycle,' people were buying CRM software without [development] models. Then they said, 'We already spent all this money and what do we have to show for it?'" Topolinksi says.

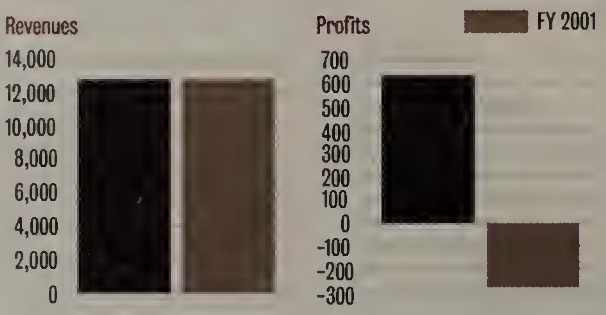
After 2002, IDC's Byron expects collaboration to be next big thing, both as independent tools and add-on features. He also says that access to third-party content within applications will become an upgrade driver, such as linking to a state tax law database from a payroll application.

Stalwart software vendors ended 2001 well compared with icons in other industries (such as infrastructure) because companies budgeted software maintenance money in relatively rich 2000 for 2001, Byron says. Microsoft and Oracle boosted income, although each posted less profit than in fiscal 2000. PeopleSoft drove revenue up 19% to $2.1 billion and profit up 32% to $191.6 million.

No so for e-business vendors. Broadview's revenue shrank 40% and it lost $833 million. I2 Technologies lost $7.8 billion, dropping revenue 12%, and Commerce One lost almost $2.6 billion, despite a 2% rise in revenue.

Outlook: Service providers

Despite the current mayhem, the two-year outlook for voice and data service providers is rosy.



NW200 SERVICE PROVIDER

REVENUES AND PROFITS, 2000 vs. 2001

Managed application, network and storage services hit $193 billion in revenue in 2001, IDC reports. While many application service providers have tanked, the category as a whole will grow at a healthy 23% worldwide from 2001 to 2006, predicts Laurie Seymour, an IDC analyst. IDC says that IP-related managed services will grow almost 26% during this time.

"I expect even the calmest part of the market to grow, not at the pace of the last couple of years, but people will continue to spend money on communications services," she says.

Metropolitan-area networks also will shine, spurred by the availability of fast and inexpensive Ethernet connections. Enterprise expenditures in the U.S. and Canada for metropolitan-access products and services will grow 552% by 2006, from $420 million this year to $2.7 billion. Services should account for $315 million this year and $2.4 billion in 2006, reports Infonetics Research.

But first, providers have to survive today's downturn. Metropolitan Ethernet start-up Yipes Communications filed for Chapter 11 earlier this month, although it plans to continue operating through a restructuring. Numerous competitive local exchange carriers are teetering too, such as McLeodUSA. After losing almost $3.6 billion in 2001, even while revenue climbed 30%, it filed for Chapter 11 bankruptcy protection in January.

Overall, 72% of NW200 service providers increased revenues in fiscal 2001, but only 39% posted profit. Albeit, half of the 10 biggest profit makers on the NW200 are service providers.

Those that lost money, lost a lot. AOL Time Warner posted a $4.9 billion loss, Nextel Communications, $2.9 billion, and Qwest Communications, $4 billion.

Those that cater to service providers are hurting, too. Ciena lost nearly $1.8 billion and Juniper Networks, $13.4 million, despite revenue climbs of 40% and 32%, respectively.

Jon Cordova, an Infonetics analyst, expects a hockey stick curve recovery for equipment makers, starting late this year.

While demand grows for data network services, promising a quick return to health, 2002 is becoming the year the industry finishes cleaning house. ■

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Bruised, continued from page 49

worth of goodwill on its books while Qwest Communications has $34 billion.

Some companies seem to be tidying up already. Akamai Technologies, 134th on the NW200 with revenue of $163 million, posted a whopping $2.4 billion loss last year. That loss includes goodwill charges for the acquisitions of Network24 and InterVU in 2000.

Agere Systems, 35th on the list with revenue of $4 billion, reported a $4.6 billion loss last year. It attributed $2.7 billion of that to "impairment of goodwill and acquired intangibles primarily associated with the acquisition of Ortel Corporation in April 2000."

This blood-bath-in-waiting aside, are you looking for signs of how the networked world will fare in 2002? Here's one indicator: In January, the Nasdaq-100, an index representing the strongest companies on that exchange, dropped 3Com, Ariba, Inktomi, Level 3 Communications, Novell and Palm.

But invariably the industry turns to Cisco as its bellwether. Cisco's second quarter, ended Jan. 26, shows sales up 8% from the previous quarter to $4.8 billion, and a profit of $660 million compared to a net loss of $268 million in that first quarter.

While that seems promising, it is the only piece of good news. When you compare the second quarter with the same quarter last year, you see sales are down 28% and profits are off 24%. Worse yet, adding up the results for the first six months shows revenue down 30% and profits 77% lower than they were in the same period last year.

Things may be getting better, but we have a long way to go before we can declare the industry healed. ■

Growth track, continued from page 49

its own venture investment division, Divine InterVentures. Such access to cash let it be a buyer during a buyer's market: It has acquired 32 companies since its inception, 16 of which it had incubated. The 16 external acquisitions, including former NW200er OpenMarkets, occurred after March 2001.

Such a spree explains why Divine is still in the red, losing $370 million in 2001. But it expects to be profitable by the fourth quarter "and thereafter," Filipowski says.

Peregrine scratches the management itch

Peregrine also grew by scratching just when the enterprise felt the itch — in this case, for better network infrastructure asset management.

Peregrine grew revenue by 123% to hit $564.7 million in fiscal 2001 from $253.3 million in fiscal 2000. That growth resulted in a whopping 36-spot jump on the NW200, to No. 83 this year, from No. 119 last.

In all fairness, this performance was helped by a funky fiscal year. Ending in March, growth occurred mainly in the 2000 calendar year, before the nation was firmly in recession. But timing wasn't the only reason. Growth was fed by two other factors, cool technology and tight integration, says Steve Gardner, CEO.

Cool technology, such as the agent-free network discovery technology gained from Loran Network Holding in September 2000, "improved market penetration," he says. Tight integration of discovery, monitoring and asset management gave Peregrine a network management suite. Gardner likens it to what SAP did a decade ago by combining resource planning, general ledger and marketing applications to manage the entire manufacturing cycle. "We're doing the very same thing, but we're doing it for corporate infrastructure," he says.

THE FIVE FASTEST-GROWING COMPANIES

Rank 2001	Company name	Revenue ($M) FY00	FY01	00-01 Rev %
122	Divine	44.1	199.6	353%
97	Handspring	101.9	370.9	264%
183	Avici Systems	15.1	53.4	254%
132	NetIQ	47.9	166.9	248%
121	webMethods	60.2	201.9	235%

WITH REVENUE OVER $500 MILLION

Rank 2001	Company Name	Revenue ($M) FY01	FY00	00-01 Rev %
83	Peregrine Systems	564.7	253.3	123%
71	VeriSign	983.6	474.8	107%
52	Ciena	1,603.2	858.7	87%
78	BEA Systems	819.8	464.0	77%
69	Network Appliance	1,006.2	579.0	74%

One hurdle to future growth is that Peregrine traditionally sells to large, multinational firms. They have the budgets and expertise to handle its a la carte modules. But those customers have long sales cycles and have forced reliance on a few big customers. Peregrine has begun pursuit of the middle market with Xanadu, an appliance that can cost less than the module approach and can be operational in 36 hours, Gardner says.

Success in new markets is imperative for Peregrine, because great revenue hasn't meant big profits. It lost $852.2 million and hasn't hit a year-end profit since 1997. The loss is largely thanks to Peregrine's acquisition spree — six companies in fiscal 2001 and three more since. But Gardner says fiscal 2003 will bring the pay off, in profit.

— Julie Bort

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The state of the network union

'OPTIMISM IN THE FACE OF UPHEAVAL' IS THE MESSAGE SIX LUMINARIES HAVE FOR THE INDUSTRY. BY JULIE BORT

Granted, the fragmented network industry doesn't have a president. But if it did, how would that person characterize its current state? What goals should the industry set for itself this year, and what lessons did it learn from last year — by some accounts the roughest ever? We posed these questions to six of our industry's most prominent members from the standards body, venture capital, vendor and end-user ranks.

While they all saw the industry through their own faction's viewpoints, they concurred on several major points: Although 2001 was tough on vendors, it was a banner year for IP and the Internet. Last year, they said, IP became the unquestioned transport of choice for every network. Our luminaries further agreed that the industry has become more rational, which is a turn for the better, despite the financial pain it causes.

Most of all, they are filled with unbridled optimism about the network industry's future and its banquet of emerging technologies. They predict that the so-called Internet bubble of yesteryear will look like a handheld sparkler compared with the fireworks to come. But to get from here to there, the industry has to achieve extended cooperation and openness in 2002.

CHRIS SICKELS

HOWARD ANDERSON

Senior managing director of venture capital firm YankeeTek Ventures; founder of The Yankee Group; and teacher of entrepreneurship at the Massachusetts Institute of Technology.

CURRENT STATUS "It is the best of times. It is the worst of times. Why the best of times? Technology has never been more vibrant. Why the worst of times? Markets are moribund. Enterprise markets are moving slowly or not at all, and the carrier market is dead in its tracks and retreating.

"There is no clear enemy to fight. In 1997 through 1998 the enemy was Y2K. It was the impetus to rob our current systems to pay for the future. When that retreated there was a new enemy: Amazon.com. We had to Webify all of our applications. By 2001, we realized that Amazon.com was not a real danger.

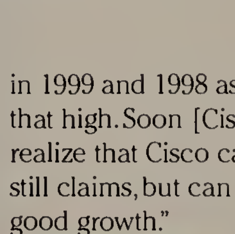
"Now spending has retreated again. In 1999, 300 [competitive local exchange carriers] were funded. Venture capital firms had overfunded. By January 2001, we realized that only one-quarter of them would survive. I see venture financing tightening because there's not going to be the absolute big payoff like before. Venture capital firms used to take mistakes public.

"Traditionally, there are two ways to improve [financial] performance. No. 1, cut costs. No. 2, build new applications. Right now, we are in cost-cutting mode."

LEGACY 2001 "The supply management problems of enterprise vendors such as Cisco in early 2001 were part of a larger problem of [perceived] insufficient supply. They built capacity in 1999 and 1998 as if demand would always be that high. Soon [Cisco CEO John] Chambers will realize that Cisco can't grow at 30% per year, as he still claims, but can at 14% to 15%, which is still good growth."

PROJECTIONS 2002 "A time is coming when we will all want a complete data network, where voice is just another application. We should get rid of our voice network as soon as we can. Carriers will still carry voice traffic, except we will be driving prices down.

"There's at least a 30% chance that 2002 will be as bad as or worse than 2001. Everyone thinks that this is the bottom, but that may not be the case. My indication is buying patterns, and I talk to buyers all the time. I use this analogy: In sky diving, the most dangerous act is to jump out of an airplane without a parachute and have a friend jump out with a parachute to catch you. The companies with the parachutes — Cisco, JDS Uniphase, Corning, Marconi, Siemens — can't catch 6,000 companies jumping out of planes."



JOHN PATRICK

Longtime IBM Internet guru (retired to consultant status in December), chair of the think tank Global Internet Project and author of Net Attitude.

CURRENT STATUS "A lot of things are big and important: Web services, the semantic Web, [a World Wide Web Consortium initiative that lets computers understand the intent of user queries], but the thing I am really excited about is 802.11. The industry has underestimated its potential. It was focused on as an alternative to ripping out walls and putting in Category 5.

"Three major things tell me this is the next big thing. One is that it's unregulated spectrum. There's no [service provider] middleman. It's a technical specification and if you follow the specs it works. The other is that the range is bigger than people think. Take a Pringles can and $6.45 worth of parts and you can make this antenna. So the range isn't 300 feet, it's miles. Third is the social factor. People really want to be connected all the time. This is one of those disruptive technologies. Sure, there are 100 reasons why this isn't going to work, but I see these things being solved.

"Another thing that's been under-estimated is instant messaging. The industry is still missing that it's not just 'chat.' It's the creation of a back channel that allows people to multitask. The productivity of this is really big."

LEGACY 2001 "2001 was a year in which the industry saw the promise of open standards. 2002 needs to be the year of execution to take advantage of open standards.

"Linux ... people ask me, how do we know this isn't a fad? There's an easy test. Talk to computer science students. Ask if they think Linux is going to be around and they'll say, 'What are you kidding? Of course.' And then go to the online bookstores and count the books. This idea of open source — people have a lot of myths. Free has nothing to do with it. [When] people don't have to wait for a vendor, they can work on things. The track record is really good."

PROJECTIONS 2002 "We have to get busy with integration across back-end systems. People expect end-to-end solutions — not just 'Click here to buy,' but 'Click here' to do whatever it is that may be part of the relationship that the person has with this organization.

"And we really need digital IDs.... That's urgent. People have all these IDs and passwords but even when using secure sites, the password and ID go in the clear over the Internet. What we need is to log on to our digital certificate and allow it to negotiate with the Web server. My hope is that in 2002 we'll get unanimity across the industry and a sense of urgency to get that in place. Passport, Liberty, VeriSign are not the answers. It has to be an industry answer — a distributed Web of trust."

SCOTT KRIENS

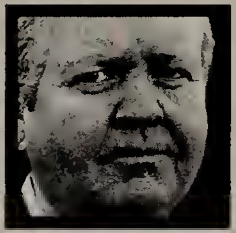
CEO of Juniper Networks, the No. 2 router maker worldwide.

CURRENT STATUS "In 2001, IP went beyond a technique for [an inter-network] and became a global communications standard. For example, the mobile network marketplace standardized around something called 3GPP [3rd Generation Partnership Project], a consensus that in the next 18 months IP will be the common protocol spoken across all mobile networks and mobile operations. Another thing, the physical plant ... has largely been laid. Much of the globe is now physically connected or in reach.

"In business, the new rules are the old rules. Fundamentals, innovation, value creation, value delivery, profitability, cash and cash flow have returned to their rightful prominence. The industry is much more prudent with its spending practices. Investment is still fundamental to the technology business, but the key is to [invest while] balancing the fundamentals. Easy to do one, hard to do both. Only those that can do both will win."

LEGACY 2001 "The shortfall in the industry last year was the failure to deliver value-added network services en masse. The importance of network security also was underestimated. Think of the cable plant as the concrete foundation for this next-generation network 'building.' As soon as the concrete dried, people started talking about the views from the penthouse. What was missing was the infrastructure that had to support it. The infrastructure allows network traffic to be delivered reliably, securely and in differentiated ways so that important traffic goes fast. Security is Job 1 today — the most important priority in the operation of these new networks."

PROJECTIONS 2002 "Public transportation is more economical than private transportation — true of networks, airplanes or trains. Businesses will run at a lower cost structure if they rely on public network services. The objective for 2002 is to deliver public services with security, reliability and performance. Demand will be real because of the cost benefits."



JOHN NALLIN

Vice president of IS for user behemoth United Parcel Service, with a $1 billion technology budget.

CURRENT STATUS "Cycles have changed again. We're back to the problem with client/server, but now it's Web stuff. Everybody's trying to entice you to get into something, and ... you're not sure how all that stuff plays together.

"The cost of hardware is going down, but [the cost of] software is going up. If [my] hardware guys look like they're doing wonderful, [my] software guys are getting killed — it's costing them three times as much as it used to.

"I'm concerned with the operating systems. [We'd like vendors] to think about the life cycle that we go through. We went from where we couldn't get anything to now we're locking the door, telling them we don't want any more. [They release a new one] every 18 months. We won't put it out when it's first available because the first six to nine months, [the vendor is still] debugging it. We can't roll out to 2,000 buildings in a year. We won't even have completely deployed an operating system when it comes off maintenance — the vendor is already concentrating on [a new version]."

LEGACY 2001 "The big thing I saw over the last year or so is the telecom shake-up. We've had cases where vendors have gone out of business ... where you use one vendor, but they are using another's facilities. There isn't an area that is not affected — voice response units, call centers, voice, cellular. Even when we have a managed service, we seem to spend more time managing it. Our concerns are stability, reliability, security. We not only need bigger bandwidth, but [also] to make sure it's reliable bandwidth.

"[I examine financials] all the time. One of our primary vendors was in questionable financial shape and I met with the president on three or four occasions last year. I'm concerned that when they are pressed, they will reduce the service I need — provisioning, response to problems and stability. With our volumes, we can't afford a slowdown. I know some of our vendors are in a little bit better shape today than they were last year."

PROJECTIONS 2002 "We're seeing a lot of play with wireless. We [deployed in March] GPRS [General Packet Radio Service] in Germany. That will replace Modicom [our mobile data service]. GPRS is working with our handheld computers and is something we'll look at domestically this year.

"We're also testing Wi-Fi and Bluetooth in some of our facilities. Those are going to improve our performance. We've been using wireless for a long time, we're just doing some new things, and we have new devices [such as wearable scanners that prove Bluetooth and 802.11 can work together].

"You'll see more of Linux coming out. We've been kicking the tires on Linux for the past year or so. If Microsoft pushes you to buy a new license, and you're talking 200,000 devices, you have to look at some alternatives."

HARALD ALVESTRAND

A Cisco engineer in Trondheim, Norway, appointed Internet Engineering Task Force chair in 2001, the first from outside the U.S to hold this post.

CURRENT STATUS "People have claimed the standards process has become slower and more bureaucratic. I don't see that. People are just expecting more from it. But they're starting to be more careful — about security, about internationalization. We now have frequent contributors from Asia, for example. It's impossible for a standard to meet someone's expectations unless that person is [involved] in the process. To have something that is adapted to the Chinese language requires that people who speak the language be present in the [development] process."

LEGACY 2001 "For the Internet, 2001 was not a bad year. The Internet kept working and growing. For instance, in the Sept. 11 time frame, the Internet was a major information medium. This points out how much the Internet has become integrated in our daily lives.

"One of the forces in 2001 was a massive movement toward IP telephony. For one thing, the ITU [International Telecommunication Union] realized that this was going to happen. I wouldn't say it agreed the movement is a good idea, but the ITU is trying to cooperate with the IETF and with the industry. We're managing to cooperate, and that's encouraging. We've even had [shared] working groups where the resulting documents were published as an IETF request for comment and as ITU specifications/recommendations."

See Union, page 66

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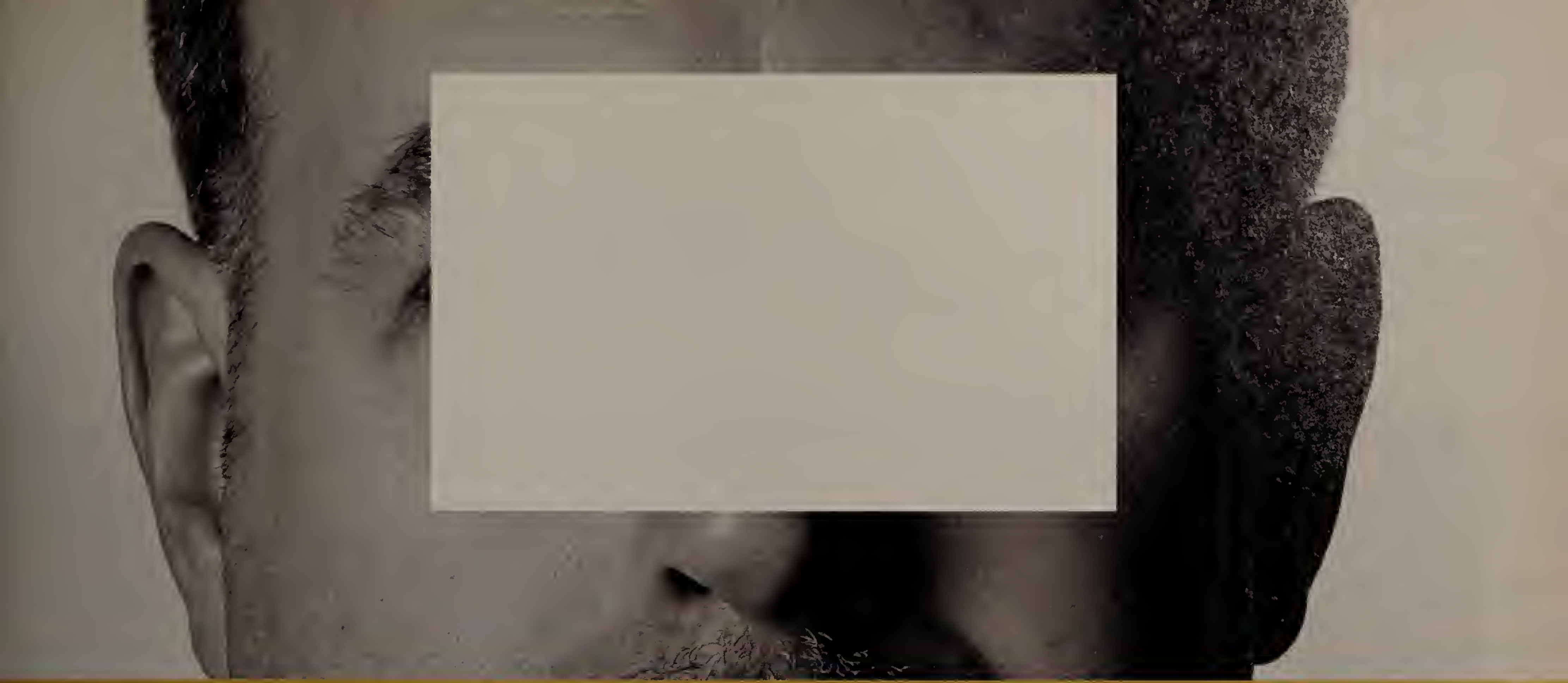

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Union, continued from page 64

PROJECTIONS 2002 "We're now seeing a more mature industry with more rational expectations ...and we are adjusting to a different dimensionality. We're talking gigabits where we once talked kilobits. [But] one of the bones of contention last year was quality of service [QoS]. We still haven't sorted that thing out. It is one of my hopes for 2002 that we manage to get standards into place that make QoS possible and rational. We have proposed solutions that have enormous costs for the providers, and we have proposed solutions that have very high management complexity.

"Getting back to one big network is my wish for 2002. We are at a stage where people are trying to fragment the network for their own benefit ... there's Microsoft .Net and other variants of the closed network or the controlled network. I hope we come out of [2002] with the understanding that we need openness."

JOHN MCADAM

CEO of traffic management software maker F5 Networks, an Internet stock bubble survivor. F5's shares reached $150 in late 1999, crashed to $6.97 by Feb. 28, 2001, but — bucking the trend — more than tripled in the next 12 months, to $21.85.

CURRENT STATUS "[This is] reality-based business. 2001 was the year the Internet was the standard for deploying business applications. The Internet became invasive within companies. The biggest change is that over a year ago, I was an evangelist. Now I focus on return on investment ...how we can optimize [the network], increase availability, reduce costs."

LEGACY 2001 "We were guilty of selling to dot-com companies, taking that growth and extrapolating it. The biggest goal that the industry missed in 2001 was growth. If you go back 16 months and look at every company's projections — they just got them wrong. There were fundamental mistakes, euphoria over the myth of this new economy.

"The public infrastructure was possibly overbuilt. It all relates to [overestimating] growth. In the communications world, they've got a lot of unused infrastructure that over time will be used, but that has caused incredible complexity. If you're a carrier, do you really benefit by an increase in mobile? Maybe not in the short term. It's going to take away your core revenue."

PROJECTIONS 2002 "I don't think we're going to see a V-shaped recovery, but we are starting to bounce along the bottom. We'll see some increase in spending toward the latter part of the second half. The No. 1 goal for 2002 is to get your house in order. One of the reasons our stock price has increased over the last 12 months is that we've demonstrated how we've increased gross margins each quarter, [improved] cash flow per operations, and reduced inventories dramatically. We had flat revenue — but when you assume that 80% of our business was dot-coms, that's a pretty good achievement.

"We'll also see more linkage between the [applications] and the network, not just by products like ours but with technology from server vendors. In the server world, the latest architecture is blade servers. That's similar to the architecture built by network companies such as Cisco — it's a network chassis — and some of the applications are identical. The server world still sees functionality as No. 1, and for the network world speed and throughput [are priorities], but there's more merging there."

"Our network is more complex than I could have envisioned a few years ago. You still have the challenge of doing it better and faster, but also cheaper. ■

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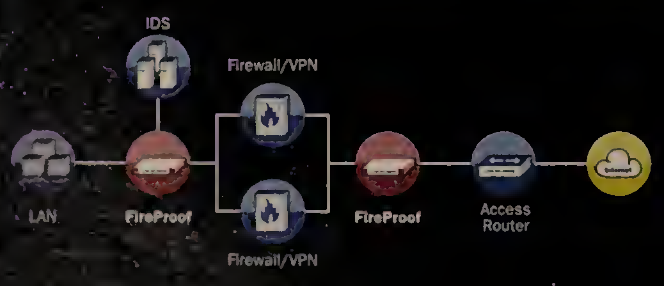

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AN INTEROP EVENT

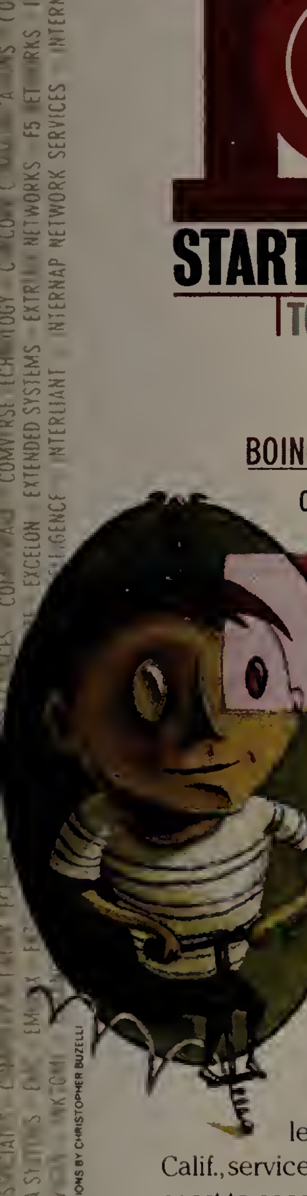
10 start-ups to watch

THESE NETWORK NEWCOMERS HAVE INNOVATIVE TECHNOLOGIES FOR THE HOTTEST MARKETS, FROM WIRELESS TO THE WEB.

BY ANN BEDNARZ

Innovation knows no restraint, as evidenced in the 90 companies nominated for our 2002 10 Start-ups to Watch Award. We received pitches on a ton of cool companies and products, so zeroing in on these 10 was tough. But they edged out the others for their mixes of technology innovation, market strategy, management experience and financial backing.

BOINGO WIRELESS



ILLUSTRATIONS BY CHRISTOPHER BUZELLI

COMPANY NAME: *Intended to convey motion, as in the bouncing from one wireless connection to another.*

ORIGIN: *Founded in February 2001 by Sky Dayton, chairman and founder of ISP EarthLink.*

FUNDING: *$15 million in one round closed in August 2001.*

KEY INVESTORS: *Evercore Ventures, New Enterprise Associates and Sprint PCS.*

CEO: *Sky Dayton*

PRODUCTS OR SERVICES: *Client software and wireless Internet access service.*

Boingo is all about aggregating wireless hot spots, but the Santa Monica, Calif., service provider isn't building its own coast-to-coast wireless network. Instead, Boingo partners with regional service providers that have built pockets of 802.11b-based connectivity. Partners include WayPort, which focuses on airports and hotels, and Surf and Sip, which focuses on cafes, hotels and restaurants. Once Boingo brokers a deal, it adds the regional carrier's hot spots to its Wi-Fi directory. So far Boingo has amassed more than 500 hot spots nationwide; by year-end, it plans to hit the 5,000 mark.

Boingo is more than a deal-maker, however. Key to its strategy is laptop software that sniffs out available wireless LAN signals then handles logon and authentication processes so the complexity of bouncing from one wireless connection to another is invisible to roaming users. The software also includes a VPN client and authenticated Simple Mail Transfer Protocol service for outbound e-mail. While the software is free, the service costs from $8 for a 24-hour session to $75 per month for unlimited access.

Boingo primarily sells its service to individuals, but says it has begun brokering deals for enterprise deployments. Competition is minimal now — nearest rivals iPass and Gric Communications specialize in dial-up roaming services and are just now addressing wireless roaming. However, the company could face a fight if top-tier carriers decide to broker their own wireless roaming deals. Also on the downside, Boingo depends on the financial stability of its service provider partners.

EGENERA

COMPANY NAME: *Suggests concepts such as "energy" and "next generation."*

ORIGIN: *Founded in March 2000 by Vern Brownell, former CTO of Goldman Sachs, and Ken Zolot, a former independent consultant to Goldman Sachs and an entrepreneur.*

FUNDING: *A $30-million second round closed in July 2001, bringing the total to $50 million.*

KEY INVESTORS: *Austin Ventures, CSFB Private Equity, Goldman Sachs, Kodiak Venture Partners, Spectrum Equity Investors and YankeeTek Ventures.*

CEO: *Vern Brownell.*

PRODUCT: *BladeFrame multiprocessing blade server.*

Egenera's founders are well-acquainted with the trials of managing thousands of servers. The two collaborated on a number of IT projects, and the experience fueled their drive to create a blade server capable of distributing computer processing power like a utility. Released last September, Egenera's BladeFrame server accommodates up to 24 blades, each of which has two or four Intel processors, in an enclosure containing network and external storage connections. The blades can be hot-swapped and support dynamic reprovisioning so administrators can allocate processing power to applications on the fly.

The buzz around blade servers is that they are faster to deploy and easier to manage than traditional rack servers, plus they use less power and generate less heat. With those perks, it's no wonder Egenera, in Marlboro, Mass., faces competition in the blade server market from big name vendors including Compaq, Dell, Hewlett-Packard, IBM-spin-out OmniCluster and newcomer RLX Technologies. But whereas most available models are edge servers for applications such as Web hosting, BladeFrame stands out with its application server approach. It supports back-end database and financial applications, and front-end applications. A limitation, at least for now, is that BladeFrame only runs Linux. But Egenera plans support for Microsoft's .Net platform late this year or early 2003.

Egenera's customers, which number in the "high teens," according to the company, include Credit Suisse First Boston and online learning infrastructure provider Blackboard. BladeFrame pricing starts at about $170,000.

FORESCOUT TECHNOLOGIES

COMPANY NAME: *Combines "fore" and "scout" to emphasize that its technology is proactive, taking security actions before an attack.*

ORIGIN: *Founded in April 2000 by four Israeli entrepreneurs.*

FUNDING: *A $12-million second round closed in August 2001, bringing the total to $14 million.*

KEY INVESTORS: *Accel Partners and Pitango Venture Capital.*

CEO: *Co-founder Hezy Yeshurun is acting CEO*

PRODUCT: *ActiveScout perimeter defense system.*

Counterintelligence is ForeScout's forte. The company's debut product, ActiveScout, sits on a server outside the firewall and monitors incoming network traffic. Specifically it watches for suspicious behavior in the form of reconnaissance probes, such as port scans that attackers often use prehack to gather information about system configurations or users. When ActiveScout identifies what appears to be a hacker scanning for network vulnerabilities, the Linux-based software feeds the suspected attacker bogus tagged data, such as usernames and passwords. If a hacker tries to send traffic based on the false network data, ActiveScout immediately blocks it.

ForeScout says its technology will reduce the number of false alarms that network managers have to chase down because the software only reacts when the bogus data is presented. Plus, because it works by identifying reconnaissance probes, ActiveScout doesn't require constant signature file updates for new viruses and hacking exploits as do typical antivirus and intrusion-detection products. Still, ForeScout faces the challenge of convincing enterprise security managers that they need this new kind of tool. ActiveScout doesn't replace firewall or intrusion-detection systems but supplements and integrates with them.

ForeScout, in San Mateo, Calif., wouldn't say how many customers it has, but named Akamai Technologies, Check Point Software and Risk Management Solutions among them. ActiveScout has been shipping since February at a starting price of $9,000.

GRAND CENTRAL COMMUNICATIONS

COMPANY NAME: *Recalls the glory days of railroads as they transitioned from point-to-point rail lines to hubs of interconnecting lines.*

ORIGIN: *Founded in May 2000 by Halsey Minor, who also started CNET Networks and Snap.com.*

FUNDING: *A $23-million second round closed in December 2001, bringing the total to $28 million.*

KEY INVESTORS: *Benchmark Capital, Goldman Sachs, Gryphon Holdings, JGE Capital, Merrill Lynch and Morgan Stanley.*

CEO: *Craig Donato, former senior vice president at Excite@Home.*

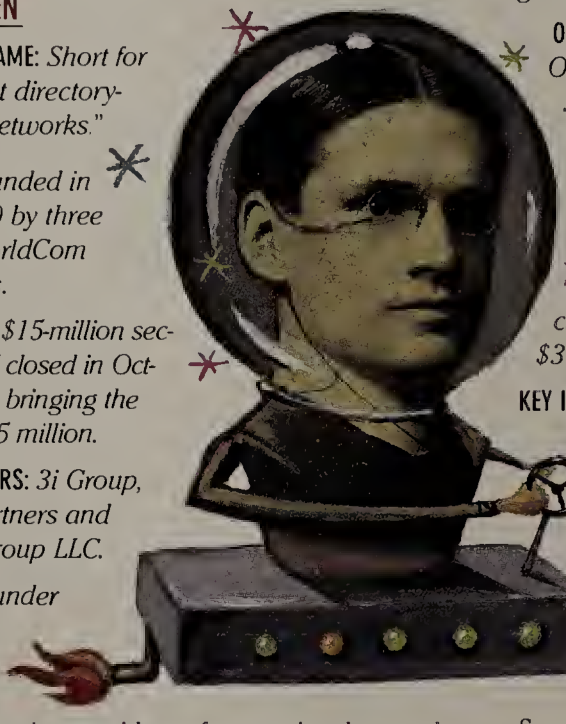
SERVICE: *Web services-based network service.*

Grand Central says Web services will provide the integration panacea companies desire. The San Francisco company has built a subscription service around managing the exchange of information between businesses and applications. At the core is a shared framework based on IBM MQ Series messaging middleware — Grand Central acts as a mediator for companies that don't want to implement and maintain middleware infrastructures, assuming the burden of security management, transaction messaging and quality of service. The idea is similar to electronic data interchange value-added networks of old. But instead of using a private network, Grand Central's service uses the Internet to route application traffic. It depends on Web services and accompanying standards, such as Simple Object Access Protocol and Web Services Description Language, to facilitate interactions between servers.

So far, customers Eastman Chemical, Putnam Lovell Securities, Thomas Weisel Partners and Wachovia like the idea. So does competitor Flamenco Networks, which offers a similar service. However, Grand Central could run into trouble if software development doesn't go the way of Web services.

Grand Central pricing averages $150,000 per year for integration hooks with up to 50 partners.

INTELLIDEN



COMPANY NAME: *Short for "intelligent directory-enabled networks."*

ORIGIN: *Founded in April 2000 by three former WorldCom executives.*

FUNDING: *A $15-million second round closed in October 2001, bringing the total to $25 million.*

KEY INVESTORS: *3i Group, Matrix Partners and mortonsgroup LLC.*

CEO: *Co-founder Dale Hecht, former WorldCom vice president of enterprise data and management services.*

PRODUCTS: *Intelliden R-Series device management software.*

Just two months out of stealth mode is Intelliden, a Colorado Springs maker of software for configuring and managing network routers and switches. Instead of manually configuring each device, Intelliden users run configuration templates and then replicate settings to targeted Cisco and Juniper Networks devices — up to 5,000 per Intelliden server. Besides being a time saver, the process aims to improve accuracy — as many as 60% of manually configured routers and LAN switches can contain at least one substantial error, Intelliden says. To reduce errors and oversights, user-defined rules establish who can implement configuration changes, which alterations require approval and when the work should be done, Intelliden says. And it's all done through a Web interface, instead of at a command line.

Intelliden's R10 package handles IP device configuration and service management, and the Intelliden R30 adds an XML-over-Java API for interfacing with back-office systems. The software is priced per device managed, starting in the "tens of thousands" of dollars range for a 50-router network. Support is now limited to Cisco and Juniper gear, but the company says it will add support for other vendors' devices as the market dictates.

The company has 15 patents pending for its technology and seven beta-version customers as of last month. Turning beta testers into customers could be a challenge though, given that service provider spending is weak and large companies will need some convincing to add to their router-management arsenal.

MARANTI NETWORKS

COMPANY NAME: *Symbolic of the strength and resilience of the Maranti tree, which grows in southeast Asia.*

ORIGIN: *Founded in October 2000 by Kuldeep Sandhu, former vice president of engineering at Efficient Networks; Santosh Lolayekar, former Cisco engineer; and Harish Nayak, former executive at TCP/IP stack vendor iReady.*

FUNDING: *A $25-million second round closed in December 2001, bringing the total to $31 million.*

KEY INVESTORS: *Alliance Ventures, Menlo Ventures and Trinity Ventures.*

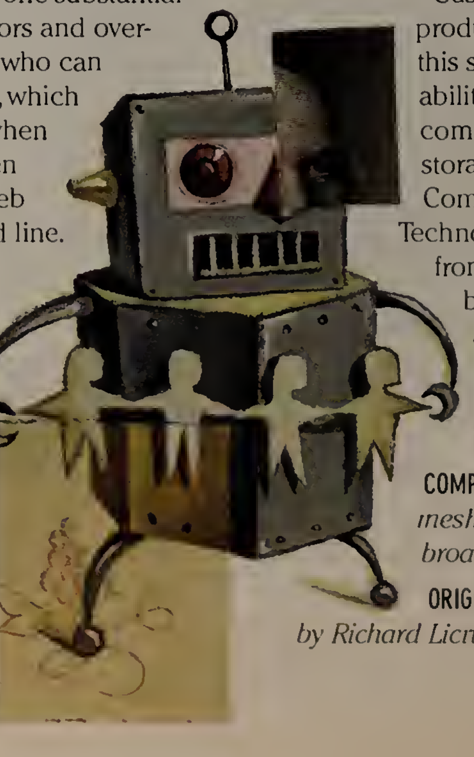
CEO: *Kuldeep Sandhu.*

PRODUCT: *Unnamed application-aware storage networking platform.*

Maranti wants to do for storage networks what application-aware switches do for data networks: prioritize service levels. The San Jose company is building a storage-switching infrastructure that's capable of differentiating between high- and low-priority applications and tailoring service accordingly. For example, an order-management system might get transaction priority over an e-mail application.

Users define storage service policies for multiple applications that access disparate storage resources, including direct- and network-attached storage and storage-area networks. The switch will connect to servers via Gigabit Ethernet and to storage subsystems through Fibre Channel and iSCSI blades. Each port will have its own virtualization engine. Industry observers expect ports to number in the hundreds, but Maranti isn't saying yet.

Customer trials and a formal product launch are planned for this summer, with product availability late in the year. Meanwhile, competition is mounting from storage incumbents Brocade Communications, Inrange Technologies and McData, and from start-ups such as Cisco-backed Andiamo Systems and Sanera Systems.



MESH NETWORKS

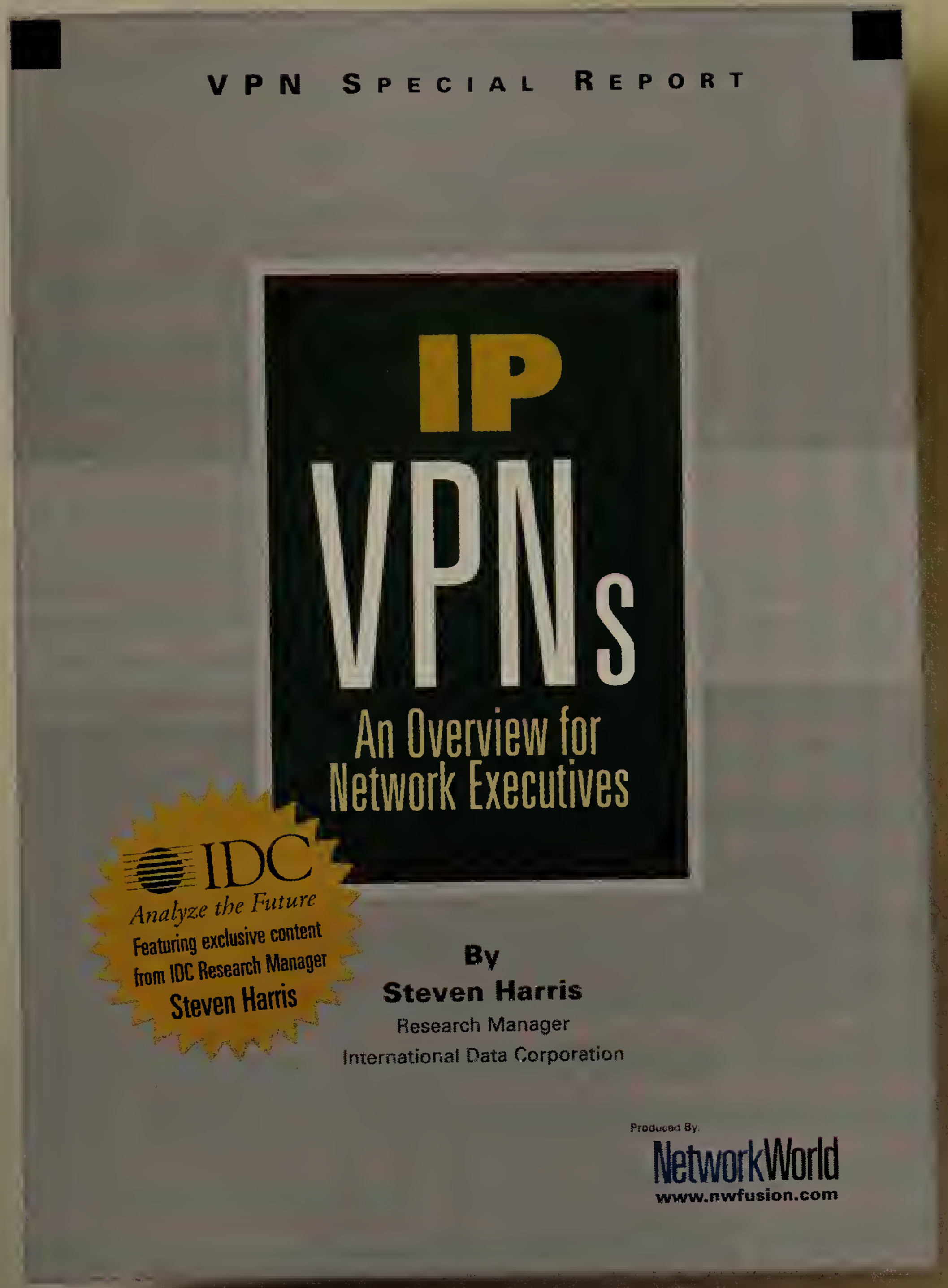
COMPANY NAME: *Derived from the mesh architecture of its mobile broadband technology.*

ORIGIN: *Founded in January 2000 by Richard Licrusi and Peter Stanforth of ven-*

See 10 Start-ups, page 72

SPECIAL REPORT

From Network World Fusion



VPN SPECIAL REPORT

IP VPNs

An Overview for Network Executives

IDC Analyze the Future

Featuring exclusive content from IDC Research Manager Steven Harris

By

Steven Harris

Research Manager

International Data Corporation

Produced By:

NetworkWorld

Internet protocol (IP) virtual private networks (VPNs) are a collection of technologies that ensure the privacy of data over a shared IP network infrastructure. Forty-eight percent of all enterprises are currently using IP VPNs, including those that are trying the technology out in parts of their WAN or for remote access. In this VPN Special Report from Network World, IDC Research Manager Steven Harris provides an expert overview of the latest "must-know" developments in this technology sector. Take advantage of this free offer from Network World Fusion and secure your copy of this SPECIAL REPORT: IP VPNs – An Overview for Network Executives in PDF format.

Steven Harris is a research manager in International Data Corporation's ISP Markets, Business Network Services, and IP VPN research programs. Steve is responsible for IP telecommunications services and Internet Service Providers (ISPs), including company strategies, markets, and technologies. He is the author of "IP VPN Services: U.S. Market Forecast and Analysis, 2001-2006" and "IP VPN Services: A Demand-Side View, 2001"

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10 Start-ups, continued from page 70

ture development firm Milcom Technologies.

FUNDING: *$27 million in two rounds in 2000.*

KEY INVESTORS: *3Com Ventures, Apax Partners, BancBoston Ventures, ITT Industries and Redwood Ventures.*

CEO: *Masood Garahi, who led development of Skytel's pioneering two-way messaging system.*

PRODUCTS: *Digital ASIC and reference designs; technology licenses; mobile broadband PC cards; routing and networking software; and infrastructure products.*

Mesh has a vision of self-forming, self-healing wireless networks. In its world, the devices are the network. Cell phones, PDAs and laptops running Mesh's proprietary peer-to-peer mobile routing protocol act as router-repeaters for every other subscriber device on the network. A Mesh device that is out of range of a typical access point could "hop" through neighboring devices or wireless routers to reach the next network access point, without disrupting other sessions. Devices equipped with the Mesh software discover and share routing information, and reconfigure routes when a device is added to or subtracted from the network or congestion builds.

Today, the company offers all the pieces needed to build its ad hoc networks, including routing and networking software, mobile broadband PC cards, wireless routers, access points, and a mobile switching controller to connect access points to wired networks. But the Maitland, Fla., company doesn't intend to stay in the gear business. If it can clear the hurdle of convincing service providers and gear makers of the validity of its approach, the company will focus on licensing its routing and management technology to device and infrastructure manufacturers, who will then develop commercial products for consumers, corporations and wireless network operators. Officials say the company hasn't signed any big licensing contracts yet, but that Mesh has teamed with fixed-wireless broadband network provider Air2LAN to offer trials of its multihopping technology in select areas.

PROFICIENT NETWORKS

COMPANY NAME: *Inspired by a Digital Island customer who sought a full-time person to engineer routes for his company and was advised to find someone "proficient in the art of internetworking."*

ORIGIN: *Founded in February 2001 by four former Digital Island executives and engineers.*

FUNDING: *$6 million in one round closed in May 2001.*

KEY INVESTORS: *Canaan Partners, El Dorado Ventures, and private investors Ed Kozel, a former Cisco CTO, and Ron Higgins, former Digital Island CTO.*

CEO: *Co-founder Allan Leinwand, who has been CTO at Telegis Networks and Digital Networks.*

PRODUCT: *Network Policy Engine NPE1010A appliance.*

"Route control" is a buzzword among service providers and their enterprise customers these days — and Proficient wants to cash in on it. The concept of route control is simple: to override Border Gateway Protocol path selection in ISP networks by determining the best path based on factors such as latency and congestion. Proficient takes things a step further than other route control vendors by factoring in business objectives. Rather than simply tuning Internet connections based on performance, Proficient can distinguish among applications and customers. High-priority traffic might move across fast, reliable connections, while lower-priority traffic might travel slower, less-expensive routes. The San Francisco company accomplishes this through its Network Policy Engine appliance. Deployed at an enterprise site, the appliance collects network traffic information, tests network paths and routes traffic accordingly, distributing loads across diverse provider networks.

Proficient says it hopes to convince network executives its $50,000 policy-based route controller is worth it in "dozens" of demonstrations under way at high-tech and financial services firms. It faces competition in the nascent route control market from companies such as netVmg, RouteScience Technologies and Sockeye Networks.

REDLINE NETWORKS

COMPANY NAME: *The red line on an engine tachometer is the point of maximum performance.*

ORIGIN: *Founded in March 2000 by three former Dell employees.*

FUNDING: *$10 million in one round closed in July 2001.*

KEY INVESTORS: *Advanced Technology Ventures, Echelon CEO Ken Oshman (the "O" in ROLM) and 3Com President Bob Finocchio.*

CEO: *Roy Johnson, most recently an executive at broadband provider 2Wire.*

PRODUCTS: *The T/X 2000 series of Web acceleration appliances.*

Redline is all about Web acceleration, but it isn't about caching. The Campbell, Calif., company has developed a family of appliances that sit in a data center between load balancers and Web servers. The appliances aim to ease the burden on Web servers by offloading I/O responsibility from Web servers, thereby reducing the number of connections those servers have to handle. Instead of going back and forth to retrieve all page elements, the appliance grabs an entire response from a server in one TCP session. It condenses the traffic, filters out extraneous content, and readies pages for delivery to requesting PCs — purportedly speeding downloads by up to 10 times in the process.

What differentiates the Redline appliance from caching devices is that it sits in the middle of the action rather than at the network's edge. Redline faces stiff competition from Web acceleration vendors such as NetScaler, Packeteer and PictureIQ. Still, the company has 30 customers, including BizRate.com, Martha Stewart Omnimedia and MSN Israel. Pricing starts at $10,000 for an appliance that serves one cluster of up to 32 servers.

VIRTELA COMMUNICATIONS

COMPANY NAME: *Combines "vir" for virtual with "tela," the Latin word for web, to suggest "virtual Web."*

ORIGIN: *Founded in April 2000 by Vab Goel, a partner at Norwest Venture Partners and former Qwest Communications executive.*

FUNDING: *A $35-million second round closed in April 2001, bringing the total to $75 million.*

KEY INVESTORS: *Juniper Networks, New Enterprise Associates, Newton Technology Partners, North Coast Technology Investors, Norwest Venture Partners, Palomar Ventures, RSA Security and Symantec.*

CEO: Christopher Clark, former Sprint executive.

SERVICES: Managed global network services, including Virtela VPN, VirtelaVideo, VirtelaVoice and Virtela Security Services.

A few things distinguish Virtela from other VPN service providers. One, the cast: Founder Vab Goel and his engineers built Sprint's IP backbone and Qwest's frame relay/ATM and IP networks.

Two, its business model: Because Virtela leases backbone capacity rather than building its own infrastructure, the Greenwood Village, Colo., carrier says it can offer VPN services at half of what it costs a company to run its own VPN or use a managed corporate frame relay service. (Virtela's core VPN service costs $300 to $1,500 per month, including local-loop charges, for each U.S. site.)

Three, its service-level agreements: Virtela SLAs cover latency, packet loss, network availability and packet jitter, among other attributes. For redundancy, each point of presence is connected to two IP WAN backbones.

Four, its menu, which includes voice, video and security services.

Five, its customer base: Virtela has more than 50 corporate and federal government customers, including AT&T Wireless, CACI, Extreme Networks, IBM and Winphoria Networks.

The fact that Virtela doesn't own its infrastructure could prove to be the company's greatest challenge, however. It could face delays resolving network problems, and it might need to buy more expensive bandwidth to honor SLAs should the "extra" capacity it consumes on carrier networks disappear. ■

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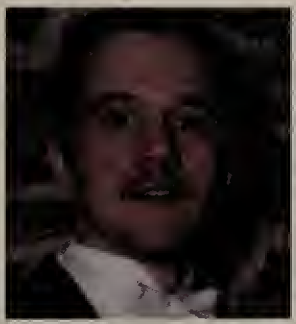

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WHERE ARE THEY NOW?

WE LOOK BACK AT OUR 2001 START-UPS TO WATCH. BY BETH SCHULTZ

Venture capital funding nose-dived in 2001 and young companies folded left and right, but most of our 2001 start-ups to watch hung tough. Five of the 10 closed additional rounds of funding in the last 12 months, to the tune of $370 million, while two of the companies say they're close to wrapping up their latest rounds. One company, Ecora, says sales are supporting its growth just fine. Meanwhile, most have strengthened their product lines and market positions, bolstered their management teams and solidified their customer bases. They are becoming fixtures on the network scene, well worth watching this year again as signals of an improving business climate.

Company	Founded	Finances	Flagship product	12-month overview	Customers
Access360 Irvine, Calif. www.access360.com	January 1999	$9 million obtained in a third-round extension closed in July, bringing total to $81.5 million.	enRole provisioning system, for access rights management, now in Release 4.0.	● Co-launched the XRPM working group to develop provisioning standards. ● Forged technology partnerships with Bionetrix, Deloitte & Touche, iPlanet and Netegrity. ● Chairman Yuri Pikover, a co-founder, handed over CEO reins to Paul Gigg, formerly CEO of XDrive, a provider of online storage and collaboration solutions.	U.S. Department of Labor, i2 Technologies, Merck-Medco, Prudential Financial.
Arbor Networks Waltham, Mass. www.arbornetworks.com	August 2000	No addition to the $11 million in one round reported as of April 2001.	Peakflow DoS anti-DDoS software, now in Release 2.1.	● Joined product integration programs of Cisco, Juniper Networks, netForensics and Network Associates. ● Partnered with security consulting firm @stake on sales. ● Expanded management team.	Undisclosed.
Asera Belmont, Calif. www.asera.com	October 1998	No addition to the $175 million in three rounds reported as of April 2001.	Asera eBusiness Operating System, now in Release 5.0	● Forged technology partnerships with Actuate, Intraware, Netegrity and Screaming Media. ● Replaced CEO Warren Weiss with David Murphy, who had been president of Tivoli Systems, and expanded management team.	Cadence Design Systems, DSM, Elemica and Steel24-7.
Cereva Networks Marlboro, Mass. www.cereva.com	April 1998	$51.3 million obtained in a fifth round closed in September, bringing total to more than $150 million in financing and credit.	Undisclosed storage system.	● Forged technology partnerships with BMC Software, Brocade Communications, Micromuse and Veritas Software. ● Replaced CEO Alan Lutz with board member and start-up expert Mahesh Ganmukhi. ● Expanded management team.	Undisclosed.
CoreExpress	August 1999	Ceased operations.	CoreExpress extranet now part of Williams VPN.	● Assets sold to Williams Communications in a private foreclosure in December. However, Williams Communications filed for Chapter 11 bankruptcy protection last week.	Not applicable.
Ecora Portsmouth, N.H. www.ecora.com	May 1999	No addition to the $12.5 million in private funding reported as of April 2001.	Configuration Auditor change management software, now in Release 2.0.	● Signed reseller agreements with Corporate Software, Softchoice, SoftMart and Software Spectrum. ● Forged strategic alliance with IBM Global Services under which Ecora assessment tools are used by IBM IT consultants.	AmGen, Fleet Securities, McKesson, Merrill Lynch, Motorola, Raytheon, Sara Lee, Sempra Energy, Snap-on Tools, University of Pittsburgh Medical Center.
GiantLoop Network Waltham, Mass. www.giantloop.com	April 2000	No addition to the $160 million reported as of April 2001.	Managed network and professional data center services.	● Broadened scope to include professional data center services such as network and SAN design, multivendor interoperability testing and infrastructure management. ● Added managed SONET and channel extension services, and released two versions of its PowerControl Web-based management interface. ● Forged marketing partnerships with companies including Cisco, Veritas Software and Williams Communications.	Managed network services customers include Options Clearing and Wells Fargo. Professional services clients include Inovant (Visa's wholly owned IT solutions company) and Lehman Brothers.
Groove Networks Beverly, Mass. www.groovenetworks.com	October 1997	$54 million in fourth-round financing closed in October, bringing total to more than $117 million. Microsoft is the primary investor in that round, taking a 20% equity stake.	Groove collaboration software, now in Release 1.3.	● Announced enterprise server line. ● Forged technology partnerships with Autonomy, Intraspect Software, PTC, Zyman Marketing Group, and a strategic relationship with Microsoft. ● Committed support to the Web Services Interoperability Organization. ● Expanded management team.	Anderson, Darpa, Dell, GlaxoSmithKline, Pew Charitable Trusts, Veridian.
Procket Networks Milpitas, Calif. www.procket.com	March 1999	$238 million in undisclosed additional rounds, bringing total to $272 million.	Undisclosed Internet infrastructure and enterprise network product.	● The company has not disclosed product and technology plans, market initiatives or strategic business relationships. ● Appointed Network Appliance CEO Daniel Warmenhoven and Procket Co-Founder and Chief Scientist Tony Li to the board.	Undisclosed.
Surgient Networks Austin, Texas www.surgient.com	December 1999	$18 million in second-round extension closed in November, bringing total to $85 million.	Surgient eQualibrium architecture and eQ2500 product platform.	● Released eQ2500 version for streaming applications. ● Certified to run RealNetworks' RealServer and Microsoft Windows Media on the eQ2500. ● Completed successful live streaming beta test of the eQ2500 with Surfline, a site that delivers surf reports and forecasts. ● Expanded management team.	In beta tests.

Network World 200

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Gerald J. Parsons
President and CEO
Communications Test Design, Inc. (CTDI)
(800) 223-3910
www.ctdi.com

CTDI provides products and service solutions to the global telecom industry. CTDI's total service offerings include Wireline and Wireless Repair & Logistics, E&I Services, Supply Services and industry leading products. CTDI's services are supported by in-house IT solutions and innovative supply chain systems.

Steve Zarrilli
Chief Financial Officer
Fiberlink Communications
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Fiberlink is a leading provider of secure remote access solutions for the enterprise market. Fiberlink offers a full range of solutions that allow organizations to securely and cost-effectively connect their remote employees and remote offices from anywhere in the world. Fiberlink's enterprise-class remote access solutions for Mobile Professionals, Telecommuters, and Remote Offices integrate best-of-breed technologies focusing on access, security, and management.

Robert Cuomo, President
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www.wirelesswans.com

FastLinks specializes in the design, installation and support of wireless wide area networks. We offer a full suite of products and services aimed at meeting every customer's needs for wireless building to building LAN, voice and video connectivity. FastLinks has proven to be a leader in its field, in part because it takes a unique approach when dealing with its customers. Unlike most wireless integrators, it looks to educate them. Educate them about the issues to be considered when designing a wireless WAN connection, the numerous options for providing connectivity, the ways to increase bandwidth while saving money, and the means for becoming self reliant. FastLinks feels that an open exchange of information and ideas results in its customers getting not only what they can afford, but also what they want.

Mitch Friend, Director of Sales
Equinox Systems an Avocent Co.
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www.equinox.com

Equinox develops and markets high-performance, reliable and cost-effective serial connectivity products. The Equinox SuperSerial product line provides serial connectivity solutions for Retail/POS, Access Control, Secure Console Port Access, Process Control, Industrial Automation, Dial Access and a wide variety of other custom applications.

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Vice President, North American Sales
Executive Software International
(818) 771-1600 ext. 4201
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www.f5.com

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(407) 380-0220
www.gta.com

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President and CEO
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Consolidation for the better

THE NETWORK INDUSTRY IS AWASH IN BANKRUPTCIES WHILE VENTURE FUNDING HAS PLUMMETED. HOW DIRE IS THE SITUATION? NOT AT ALL, EXPERTS SAY.

BY SUSAN MARKS

The health of the network industry is in a nerve-racking state. It's reeling under some of the largest bankruptcies and mergers ever, is scandalized by a few of its members' questionable accounting practices, and is generally enduring its biggest downturn ever. But this severe consolidation, while painful, isn't terminal. It is actually a healthy, natural realignment, say analysts, venture capitalists, investment bankers, vendors and other experts.

The athlete's axiom "no pain, no gain" could be the motto for the current condition. These harsh facts show an industry that is contracting:

- Publicly traded companies are filing for bankruptcies at an unprecedented pace, according to Federal Deposit Insurance Corp. and BankruptcyData.com. In 2000, 176 public companies filed for bankruptcy. In 2001, 257 did, with 34 — about 14% — from the telecom industry. Already from January through March, 61 public companies have gone under. Among the recent high-profile cases are international data carrier Global Crossing; telecommunications carrier McLeodUSA; and wireless e-mail service provider Motient. (See a chart of major recent transactions at www.nwfusion.com, DocFinder: 9023.)
- Acquisitions, particularly of start-ups, are down: For example, in 2001, Broadview International, a prominent global mergers-and-acquisitions adviser for the IT industry in New York, helped complete 41 M&A transactions worldwide, worth about $3.15 billion. In 2000, it did 105 transactions, valued at nearly $32 billion, it says. Cisco, the start-up acquisition poster child, acquired only two companies in 2001, none so far in 2002, compared with 23 in 2000 and 18 in 1999.
- Venture capital spending is down: Venture capital firms spent $36.5 billion on 3,928 deals in 2001, compared with $99.6 billion on 7,094 deals in 2000, according to the PricewaterhouseCoopers/Thomson Venture Economics/National Venture Capital Association MoneyTree Survey.
- Epic mergers between public companies are brewing. Most prominent is Hewlett-Packard's and Compaq to the tune of abut $20 billion. But other recent mergers include equipment vendor Ciena and ONI Systems in optical networking, and Paradyne Networks and Elastic Networks in DSL equipment.

Yet an abundance of gloomy news is not an apocalypse. Venture capital spending in fact remains far above historic levels, says Kirk Walden, national director venture capital research for PricewaterhouseCoopers. "Normal was not 1999 and 2000. Those were anomaly years and completely unsustainable."

And, venture capital invested in start-ups appears to be coming out of its nosedive, according to a special analysis of quarterly venture capital data compiled for *Network World* by PWC, the National Venture Capital Association and Venture Economics. The amount of these investments leveled off at $4 billion during the fourth quarter of 2001 (www.nwfusion.com, DocFinder: 9021). While that figure is off 73% from the high-water mark of the Internet boom, it's still roughly double the amount invested

CHRISTIAN NORTHEAST

before that bubble. Also, the percentage of start-up companies that fail — 40% — is about the same now as it has been for the past five years, says Jesse Reyes, vice president of product management for equity research firm Venture Economics. "The only difference we are seeing now is a lot of those companies are failing in public markets and in the limelight rather than dying a nice quiet death in someone's portfolio."

Today's unrest is simply the ebb part of the industry's ebb-and-flow cycles, says Rich Mogull, information security analyst for Gartner. "I don't see this as being any huge crash of the system."

Close to a turnaround

Even the telecom industry, struck by lightning in this downturn, hasn't departed from a normal cycle. It consolidates every five to 10 years, and has endured worse, says Christine Heckart, president of TeleChoice.

In the early post-Bell breakup years, 1984 to 1988, there were about 3,000 service providers. In late 1987 and 1988 consolidation decimated the ranks by half. At the time, Heckart was with WilTel International (later bought by LDDS and in turn became WorldCom). Her first project was to find out who was left. "As a provider's provider, we were concerned that the industry was dying," she says.

The reality was that the shakeout was the precursor to growth, as she predicts this one will be.

Moreover, what's carnage for some is opportunity for others. In the fall of 2001, Polycom was flush with cash. So it went shopping, acquiring PictureTel in October. Under normal market conditions, Polycom might have had to fight for the rival videoconferencing equipment maker, says Joe Tort, Pricewaterhouse-Coopers global partner in networking and computing. Instead, Polycom bought PictureTel for cash and stock worth about $362 million. "Now they are a big strong company in the broadband networking space, and ready to do extraordinarily well."

Polycom isn't alone. Long distance service provider IDT picked up the operating assets of bankrupt competitive local exchange carrier (CLEC) Winstar Communications. Metropolitan Ethernet service provider Cogent Communications bought those of bankrupt PSINet.

Still, the industry hasn't hit bottom yet. While the flimsiest Internet companies are gone, the ebb will continue until the remaining companies that should disappear, do. These are companies founded in the 1998-99 boom with lots of investment capital, great ideas, good engineering and solid business plans, but no customers, says Woody Benson, a principal with venture investment firm Lazard Technology Partners. Many of these companies, public and private, targeted their offerings to CLECs and other service providers hardest hit. They have since changed business plans radically or are limping along on decimated capital expenditure budgets, Benson says.

Also the pendulum is about to swing back, predicts Richard Dean, program director for infrastructure integration and support services for IDC. He cites inventory management as evidence. During the boom, vendors such as Cisco, Lucent and Nortel couldn't produce product rapidly enough. They increased capacity, which became overcapacity when buying slowed. But excess inventories are slowly balancing, Dean says. He expects 10% to 15% growth of revenue and profits in the second half of the year.

New coping tactics for users

Although the big picture shows that the industry is in good health, network executives should still alter tactics for today's harsh realities. A weak global economy has pushed the normal evolution into a worst-case scenario, Heckart says. Many viable companies that might have been acquired have ended bankrupt.

See Consolidation, page 80

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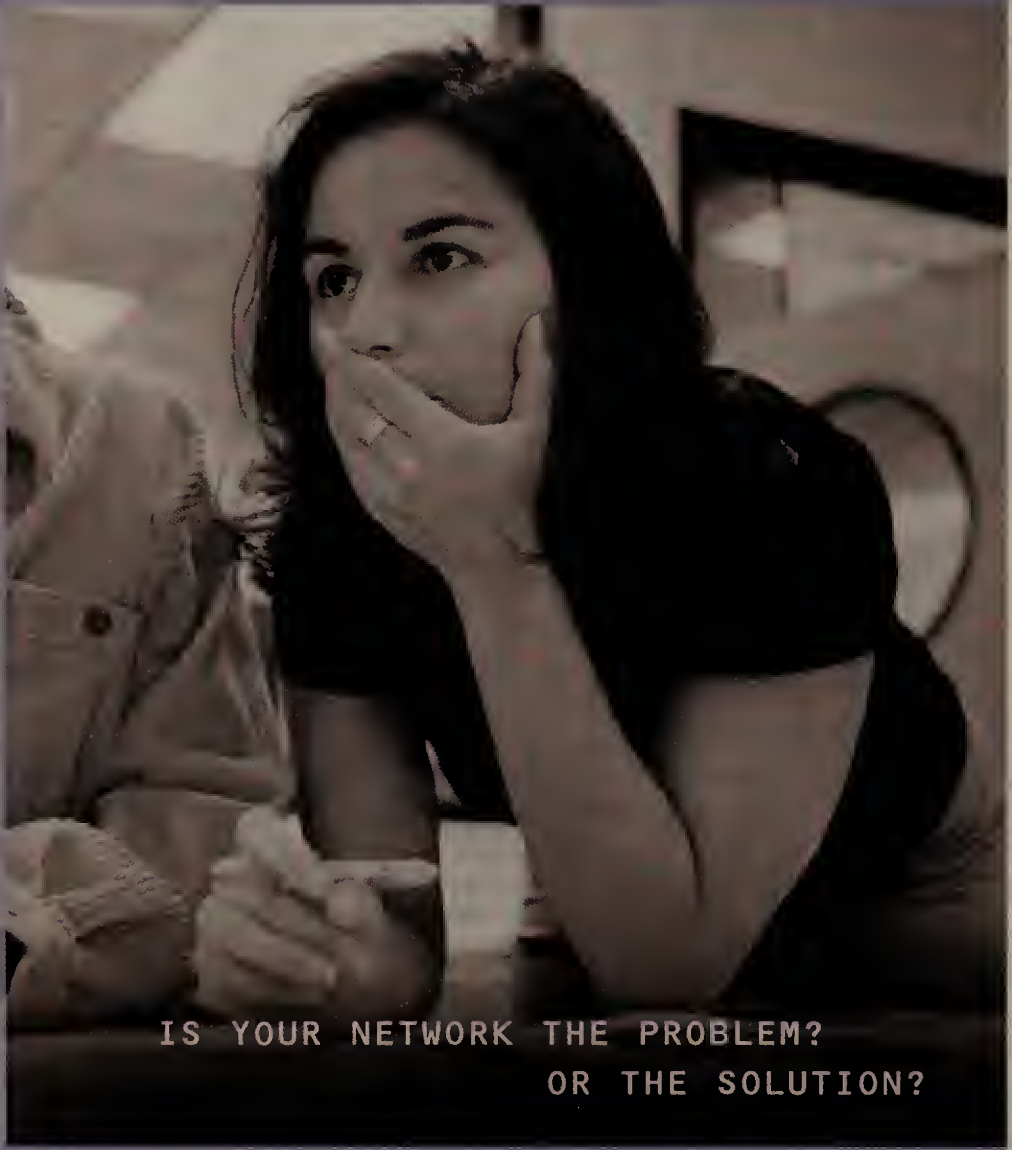
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President and CEO
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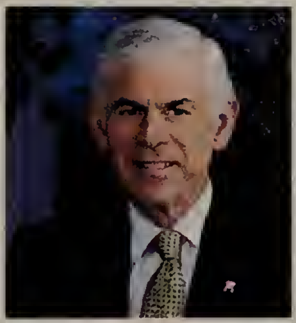

Lawrence A. Weinbach
Chairman, President and CEO
Unisys Corporation
(215) 986-3501, www.unisys.com

Unisys is a worldwide information technology services and solutions company whose 37,000 people help clients in more than 100 countries utilize technology to seize opportunities, overcome challenges and succeed in the global economy. The company offers a rich portfolio of business solutions led by its expertise in consulting and systems integration, outsourcing, network services and security, coupled with leading enterprise-class server and related technologies. Primary vertical markets for Unisys worldwide are the financial services, transportation, communications, media, commercial and public sectors, including U.S. federal government customers. Unisys is headquartered in Blue Bell, Pennsylvania, in the Greater Philadelphia area.

Jamie B. Bader, President and CEO
Quarry Technologies Inc.
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www.quarrytech.com

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Consolidation, continued from page 80

"The marketplace is strewn with distressed assets and that doesn't mean that one ought to go and buy them all," says Eugene Lee, Cisco vice president of enterprise marketing.

Network executives must perform even more thorough financial checkups on potential vendors, watch current vendors constantly and plan for a vendor's failure, says Harry Jarrett, who, as director of global network technology & architecture, oversees the internal voice and data networks of NCR in Dayton, Ohio.

In 1999, NCR needed high-speed service for its network of remote offices, so the company turned to CLECs, including Rhythms NetConnections. Rhythms filed for bankruptcy in August 2001 and NCR found itself scrambling. "We were not prepared for it," Jarrett says.

Today NCR diligently reviews the finances of its vendors and has fallback plans in case its vendors fail, such as a two-tier VPN management system for high-speed connections to remote offices. Individual offices opt for an ISP of choice, but the VPN components, including client software, are managed by AT&T. AT&T distributes and installs the VPN components, and provides initial support when network problems occur.

Smaller vendors: to ditch or keep?

In uncertain financial times like these, enterprise buyers tend to move to fewer and larger vendors. The flight to vendor quality is how Jim Hale, senior partner at venture capital firm FTVentures, describes it. This trend leaves smaller vendors scrambling no matter how solid their funding, how good their product or blue-chip their customer list. In some cases the vendor's only recourse is a merger, he says.

A future benefit of the movement toward bigger, established vendors could be better integration of product suites, says Elisabeth Rainge, analyst for IDC. During the go-go acquisition days, companies would buy new network devices that added functionality but often didn't truly integrate them with existing products. She cites the case of Cascade/Ascend/Lucent. Cascade, a provider of WAN products, was acquired by Ascend, which in turn was acquired by Lucent in 1999. "Folks still look to manage those Cascade devices separately," Rainge says. "They don't necessarily integrate with other Lucent products, or in many cases with other Ascend products."

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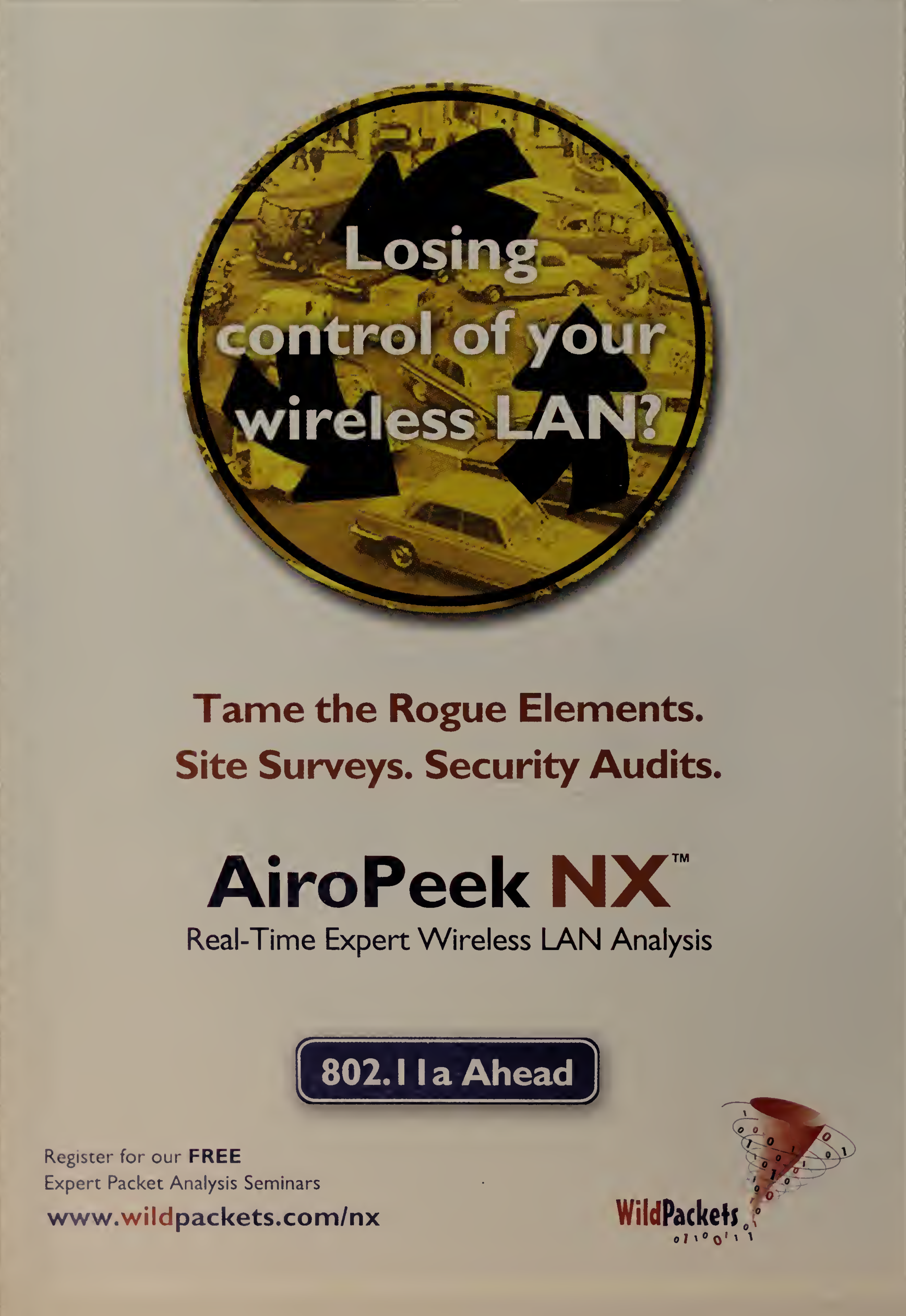
With a slower pace of acquisitions, and stable customers, big companies are focusing on refining their existing product lines, including providing the promised integration of technologies purchased in the buying frenzy days.

Likewise, enterprise users who might have tried new vendors two years ago, today tend to stick with familiar products, adds Jason Smolek, IDC analyst specializing in enterprise networks and IP VPNs. So emerging market segments such as Gigabit Ethernet see slower adoption rates than pundits once predicted. But no matter how safe the tried and true seems, this isn't always the best buying strategy. Sound smaller vendors may be offering great overall deals "better than the mainstream ones," Smolek says.

Whether a recovery is three months or two years away, the industry knows now that a newfangled economy was a myth. Bust always follows boom. But then again, boom follows bust, too.

Marks is a freelance writer in Denver. She can be reached at sjmarksco @aol.com.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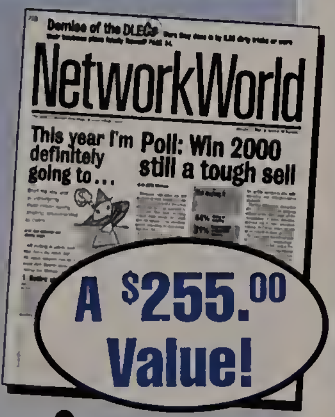

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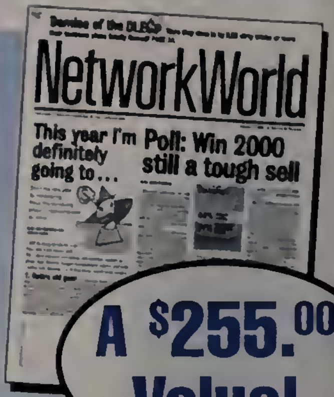

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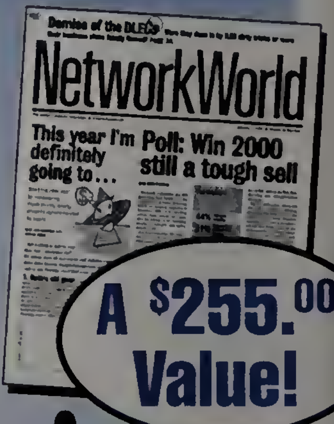

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◆ NW200 miscellany

WE REVEAL LITTLE-KNOWN FACTS ABOUT SOME WELL-KNOWN NETWORK COMPANIES.

BY DENISE DUBIE

Does the "B" in IBM stand for "business" or does it really signify butcher? What company CEO could best define the term hat trick? Was Electronic Data Systems named through divine intervention? And what is it about Computer Associates Chairman Charles Wang and ice cream?

Here you'll find the answers to these and other probing questions about some of the Network World 200 companies that grace our headlines week to week.

On this butcher thing: In the early days of IBM, founded in 1911 as The Computing-Tabulating-Recording Company (C-T-R), salesmen pitched all sorts of machines, among them meat grinders. The company's early catalogs also featured commercial scales, industrial time recorders, tabulators, punched cards and cheese slicers (to go with those meat grinders, apparently). So the company changed its name from C-T-R to International Business Machines for good reason. For those deli-ware doubters, or just the curious, today's network icon keeps all that old machinery on display in Somers, N.Y.

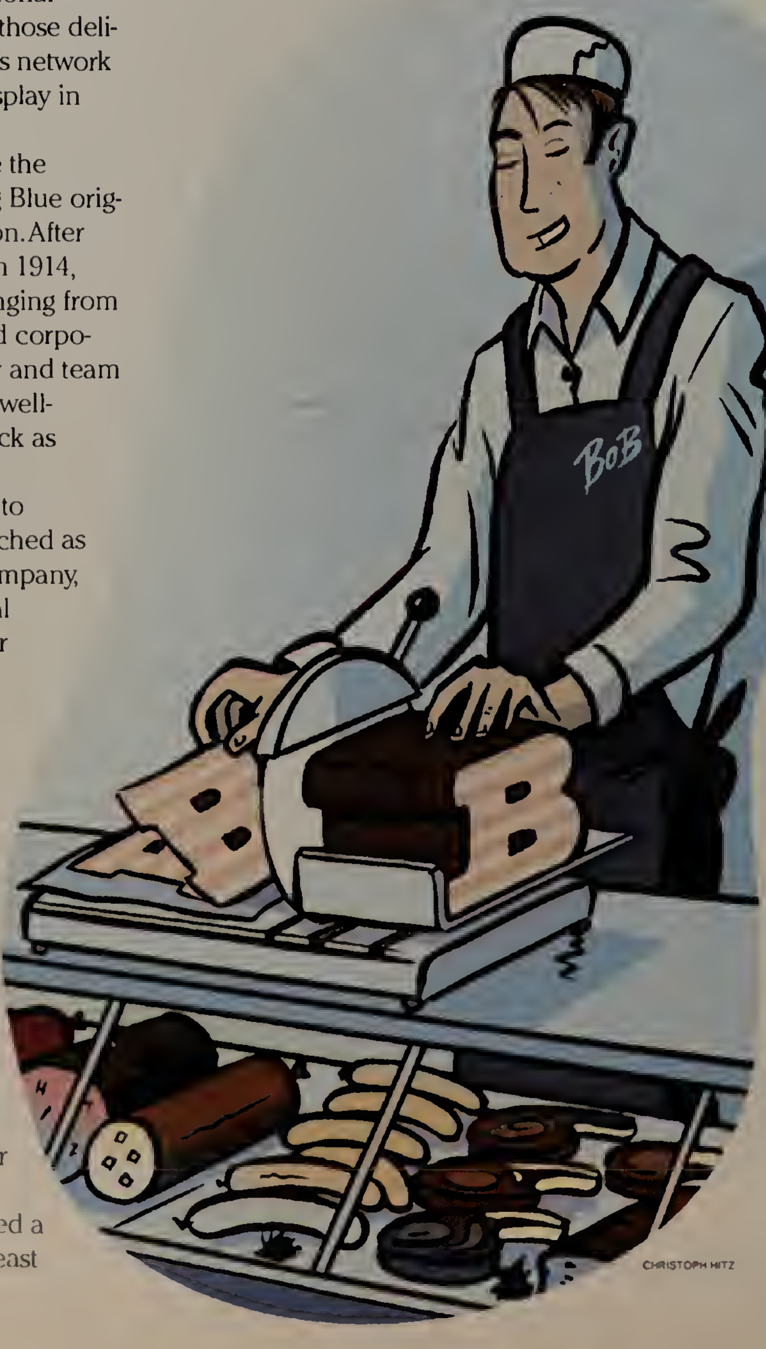
And if you have ever wondered where the straight-laced, conservative image of Big Blue originated, the answer is with Thomas Watson. After coming on board as general manager in 1914, Watson implemented many policies, ranging from sales incentives to customer service and corporate activities that built company loyalty and team spirit. But it was Watson's "insistence on well-groomed, dark-suited salesmen" that stuck as IBM's image for decades.

Of course, IBM isn't the only company to change its name or mission. Nortel launched as the Northern Electric Manufacturing Company, and in 1895, it developed the No. 3 Signal Box, one of the first fire-alarm boxes ever made. Five years later, the company now called Nortel produced the first Canadian gramophone, a precursor to the phonograph.

Outside of work hours, true to its Canadian heritage, Nortel sponsored a hockey league. One of the players, Joe Malone, went on to the National Hockey League's Quebec Bulldogs and on Jan. 31, 1920, became the first NHL player to score seven goals in one game. Malone's record stands today.

NW200 company Compuware also helped turn out NHL players. A year after founding Compuware, Peter Karmanos, Thomas Thewes and Allen Cutting formed a hockey league for the children of southeast Michigan. Among the 50 or so alumni of this youth league are NHL players Brian Rolston (Boston Bruins), Bryan Berard (New York Rangers) and Eric Lindros (New York Rangers).

Compuware remains a hockey company. CEO Karmanos co-owns three hockey teams: the Carolina Hurricanes (NHL), the Plymouth Whalers (Ontario Hockey League) and the Florida Everblades (East Coast Hockey League).



CHRISTOPH HITZ

Like Compuware, storage vendor EMC had three co-founders — well almost. Dick Egan, Roger Marino and a man whose last name started with "C" came up with the company idea in 1979. When Mr. C got cold feet and backed out of the company, the others decided it was too expensive ($100) to get his initial out of their company name. So the C stayed, but the man has remained forever anonymous.

Some companies came to their names through more conventional inspiration. Take EDS. H. Ross Perot incorporated the company on June 27, 1962, but rumor has it he came up with the name in a not-so-corporate environment. Combining the words "electronic," "data" and "systems" struck Perot while scribbling potential names on a pledge envelope during a service at Highland Park Presbyterian Church in Dallas.

Although Perot got EDS off to its start in God's house, he wasn't favored with any fast miracles for getting business. Perot had bought unused capacity on Southwestern Life Insurance's IBM 7070 mainframe computer with the hope of reselling it to other companies. It took Perot two months and 78 sales calls to find EDS' first customer.

Many companies in their early days had to make do with few resources. It's well known that Microsoft operated its software business from one room during the company's first years, but others also plodded along without the technological resources they now afford their users.

Micromuse operated out of a rented room above an auto repair shop in London's Chelsea district. The engineers got the back half of the room and the sales the front, but they all suffered from the frequent London rain and leaky roof. All visitors were greeted by the founder's dog, Olive, who dutifully sat on a sofa just inside the door.

Novell employees — then and now — can sympathize with those Micromuse pioneers and their less-than-ideal working conditions. Novell got its start in a vacant truck dealership in an industrial park in Orem, Utah. Now it is located next to a golf course and a waste-processing plant. Depending on the day, employees are either dodging golf balls flying through the windows or struggling to take a fresh breath with the ripe smell wafting across the campus.

Things are much more idyllic over at Computer Associates. Back in CA's early days, employees often heard the ding-dong sound of an ice-cream cart wending its way across campus. Despite his cutthroat reputation, CA co-founder Wang didn't hesitate to give his staff treats in the early days. Wang would hand-deliver ice cream to CA employees on especially warm days. And the company since 1976 has given all employees free breakfast on site — after all, starting the day with a healthy meal makes people more productive! ■

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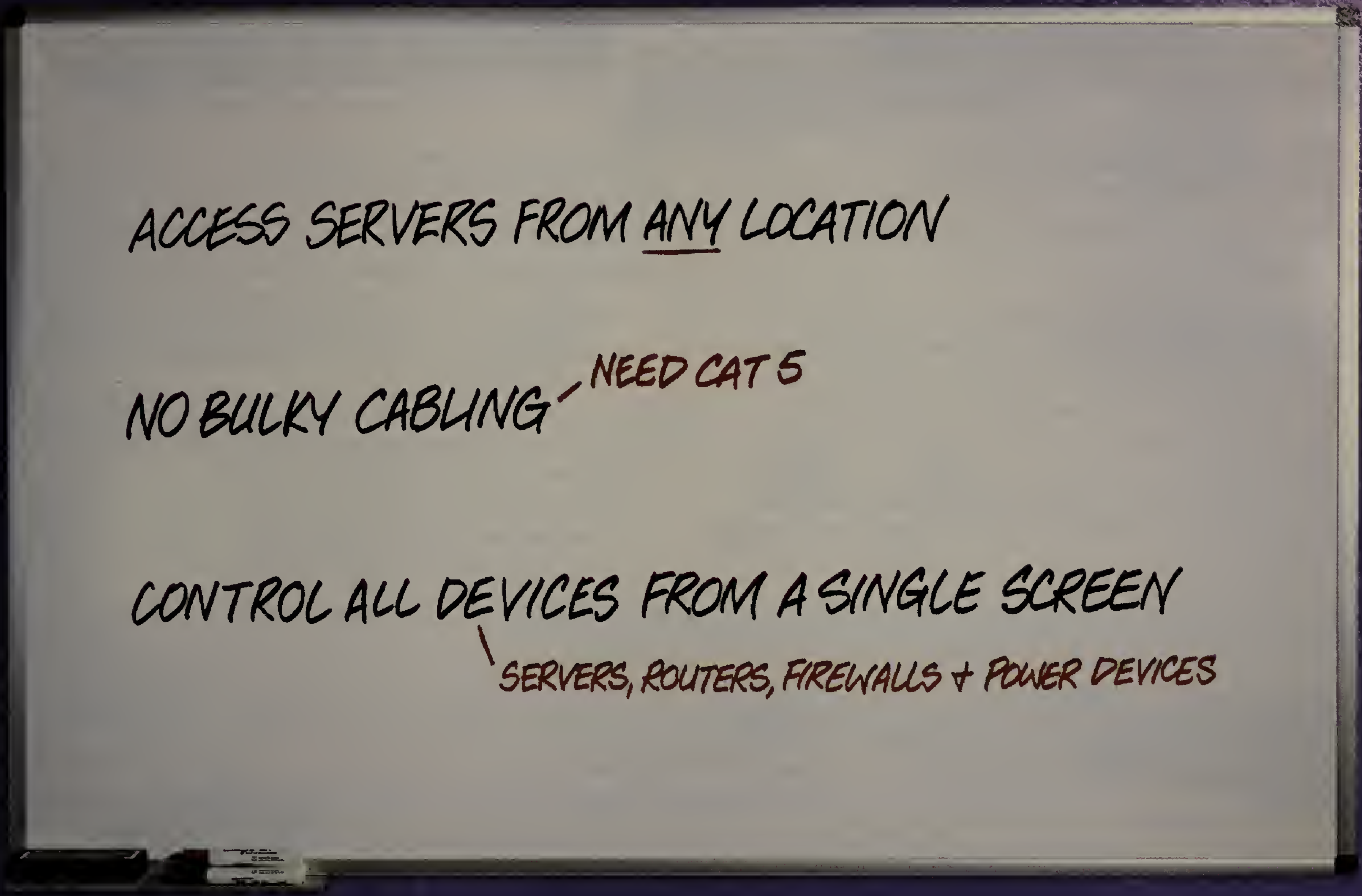
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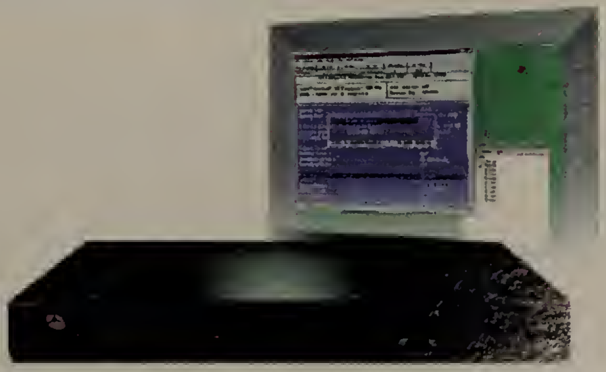

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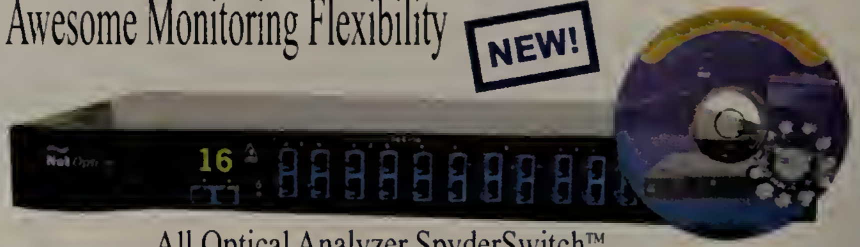

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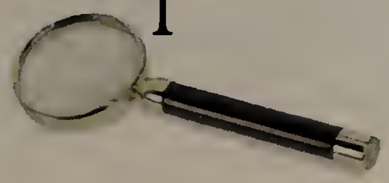
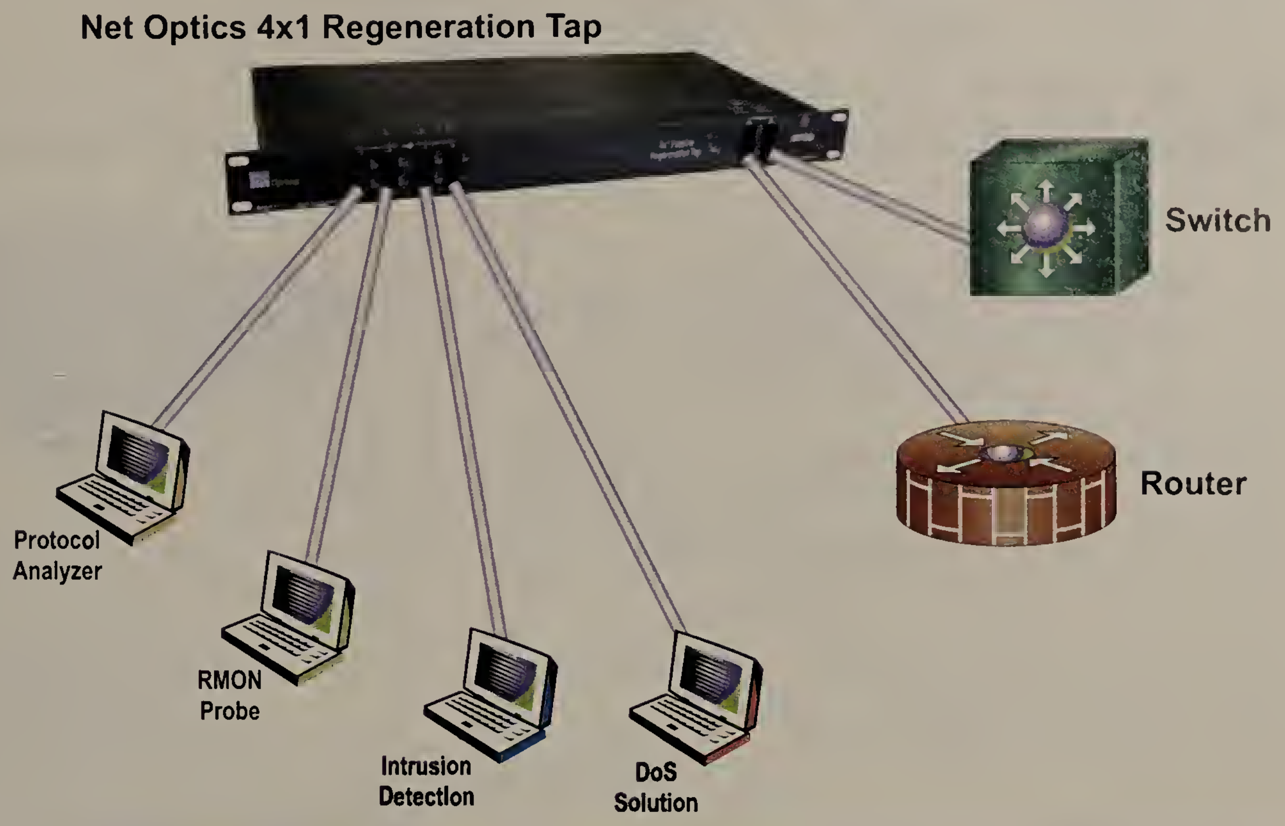
Multiple Views of Network Traffic Via a Single Access Point





- **What protocols are in use across the network?**
- **How many packets were sent over this segment?**
- **Does this packet contain any known attack signature?**
- **What is the source of this network based anomoly?**

Figure 1. Monitoring Made Easy: Net Optics' 4x1 Regeneration Tap provides multiple views of network traffic through a single access point.

REAL TIME, SIMULTANEOUS MONITORING

From avoiding next year's Nimda to troubleshooting slow connections, network managers must address a growing host of vulnerabilities. A state-of-the-art solution draws from multiple classes of monitoring tools, including RMON probes, protocol analyzers, intrusion detection systems, and DoS solutions.

Each class answers a different set of questions about the health of your network. For example, a protocol analyzer can tell you what protocols are in use across the network. An intrusion detection system can reveal whether a packet contains a known attack signature. Until now, combining different classes of information for timely diagnostics has been difficult. With Net Optics' 2, 4, and 8x1 Taps, you can now answer these questions - and more - simultaneously, and in real-time for all fiber topologies including GigaBit Ethernet, Fibre Channel, and SONET..

MONITORING MADE EASY

Net Optics' 2, 4, and 8x1 Taps enable real-time, simultaneous network monitoring by multiple (2, 4, or 8) protocol analyzers, intrusion detection systems, or other devices for monitoring and troubleshooting. Installing these passive Taps enables multiple views of network traffic through a single access point, providing network managers with unprecedented levels of relevant, real-time information to anticipate and solve networking issues.

By enabling real-time, simultaneous monitoring, these Net Optics Taps also help network managers increase their return on monitoring device investments. Prior to the introduction of these Taps, network managers would need to attach each relevant device in-line, potentially introducing signal delay and multiple points of failure into the network, or attach each device serially, breaking the network connection each time a different device was attached. Net Optics' non-blocking 2, 4, and 8x1 Taps mitigate this problem by providing a single connection point for passive monitoring via multiple devices. With a 2, 4, or 8x1 Tap, network managers can gain 24/7 use of monitoring devices that otherwise may be idle, or non-optimally deployed.

PLUG AND PLAY

Net Optics 2, 4, and 8x1 Taps are the only Taps available today that allow concurrent monitoring without blocking signal information. These rack-mountable Taps feature easy installation and broad compatibility: network managers can simply plug in the network cables to communicate with all major monitoring and analysis products including Network Associates' Sniffer®, NetScout's *n*Genius Probe,™ Cisco's SwitchProbe, and Agilent's Internet Advisor, to name just a few. Additional features include half or full-duplex transmission support, and two load-sharing power supplies. If either power supply fails, the remaining power supply immediately assumes the additional load.

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Net Optics, a global fiber optics technology leader, is a recognized inovator in network security and reliability.

Net Optics offers a full range of custom fiber optics and copper based products and services including Taps, Analyzer Switches, Redundant Port Selectors, and Network Test and Simulation products. All Net Optics products are 100% tested prior to delivery and include ongoing technical support.

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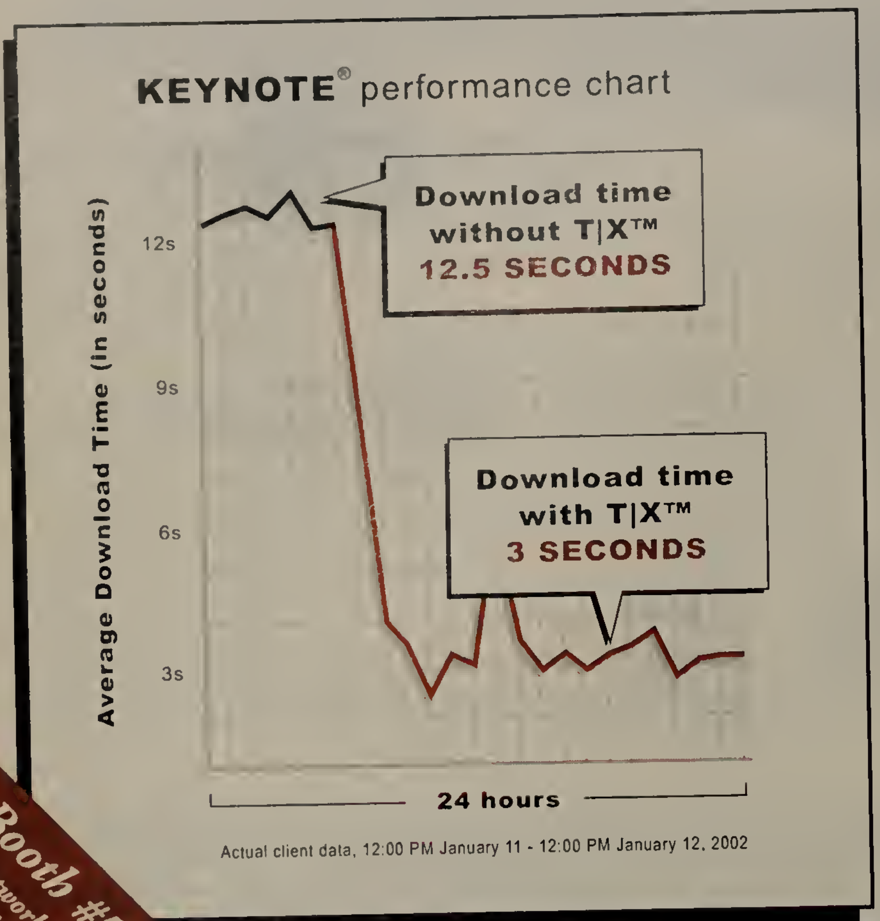

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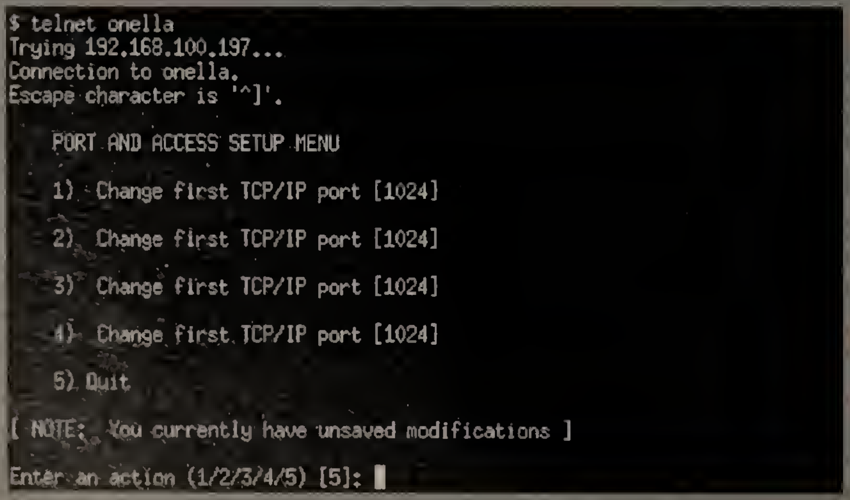

```
$ telnet onella
Trying 192.168.100.197...
Connection to onella.
Escape character is '^]'.

   PORT AND ACCESS SETUP MENU

   1) Change first TCP/IP port [1024]

   2) Change first TCP/IP port [1024]

   3) Change first TCP/IP port [1024]

   4) Change first TCP/IP port [1024]

   5) Quit

[ NOTE: You currently have unsaved modifications ]

Enter an action (1/2/3/4/5) [5]: █
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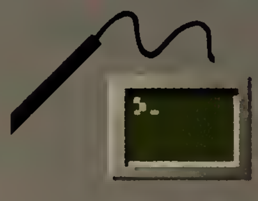
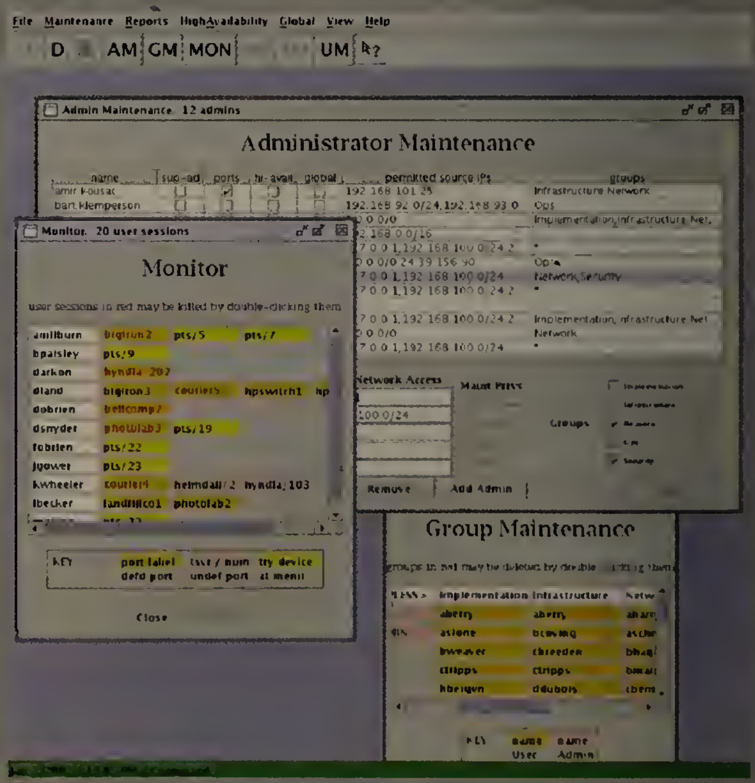


Term Master software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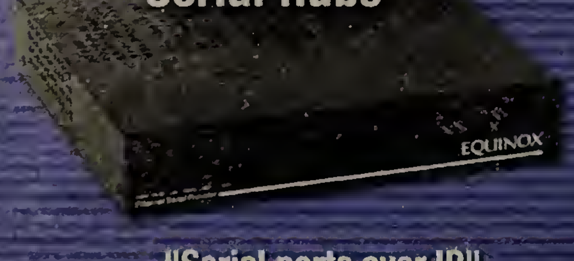

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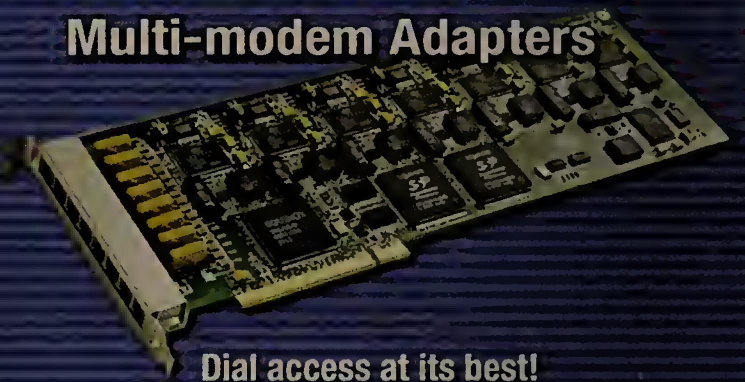

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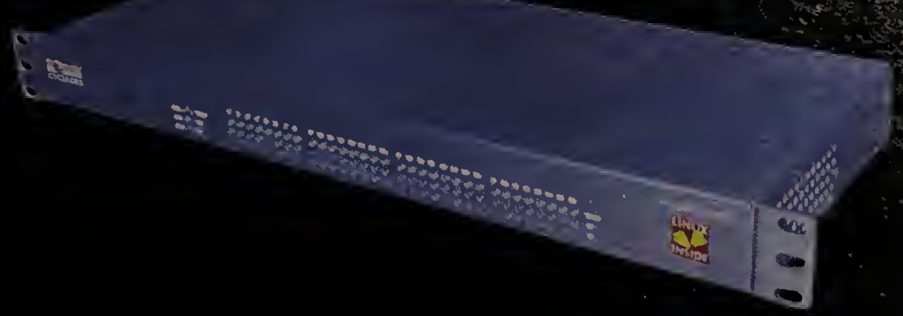

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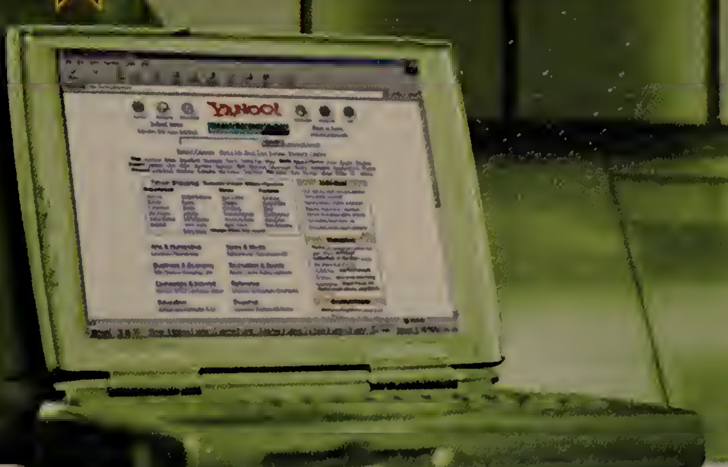

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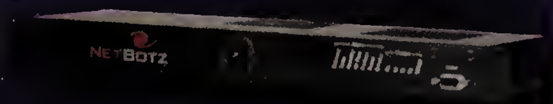

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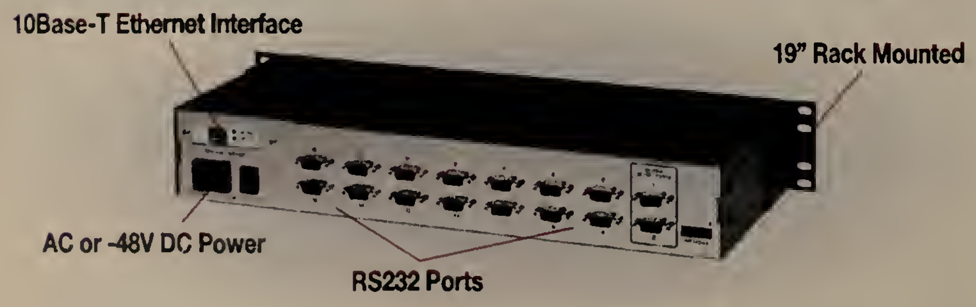

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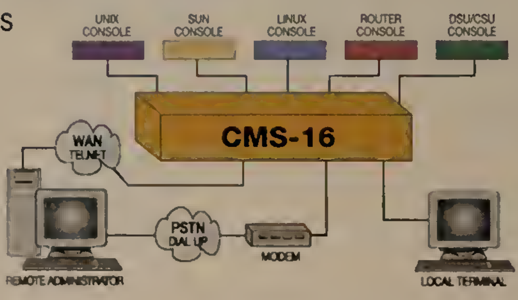
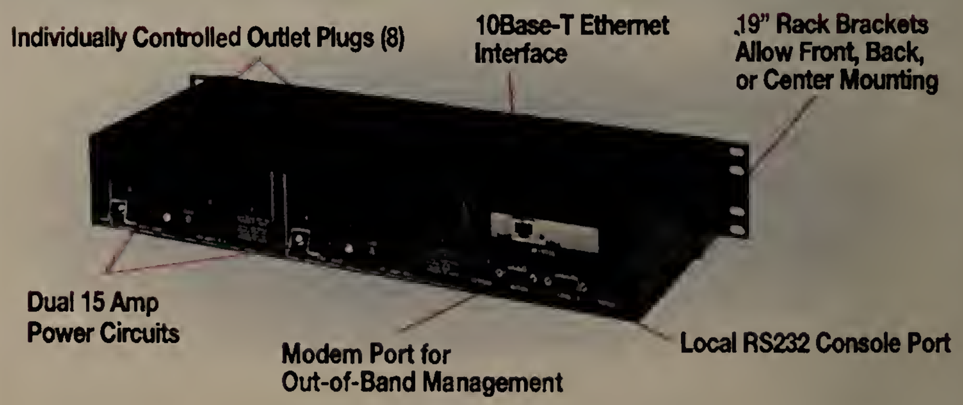


Telnet and Dial-Up Network Power Switch

Reboot Locked-up Equipment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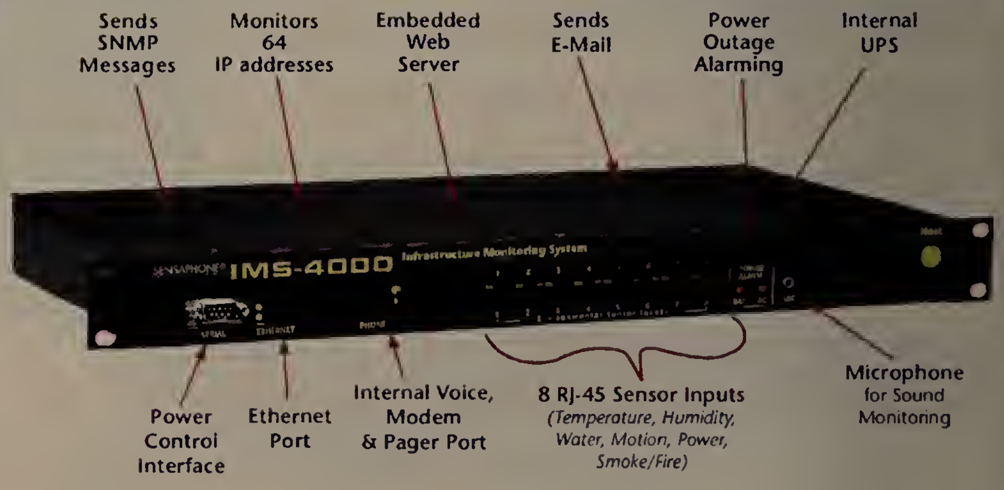
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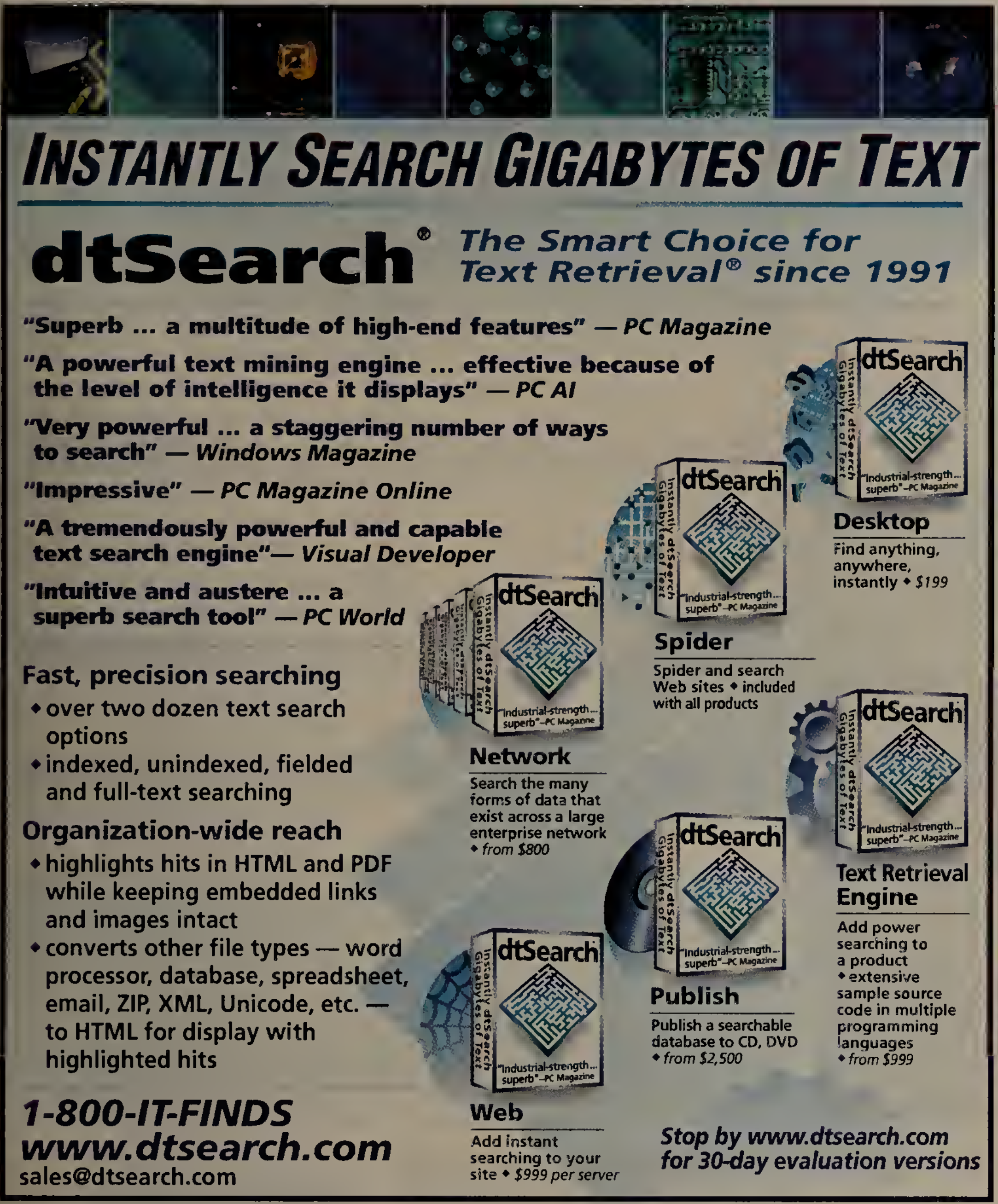

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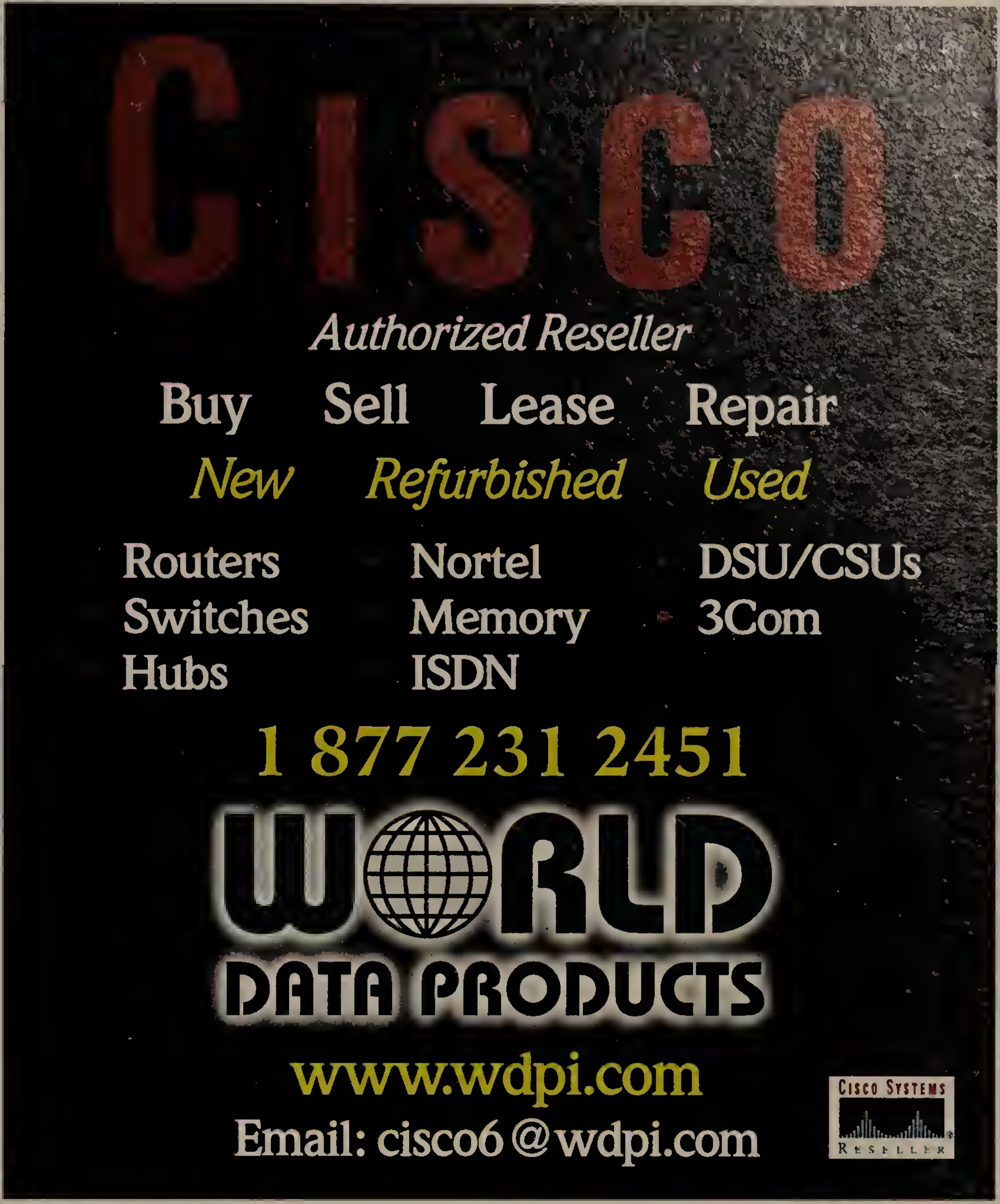

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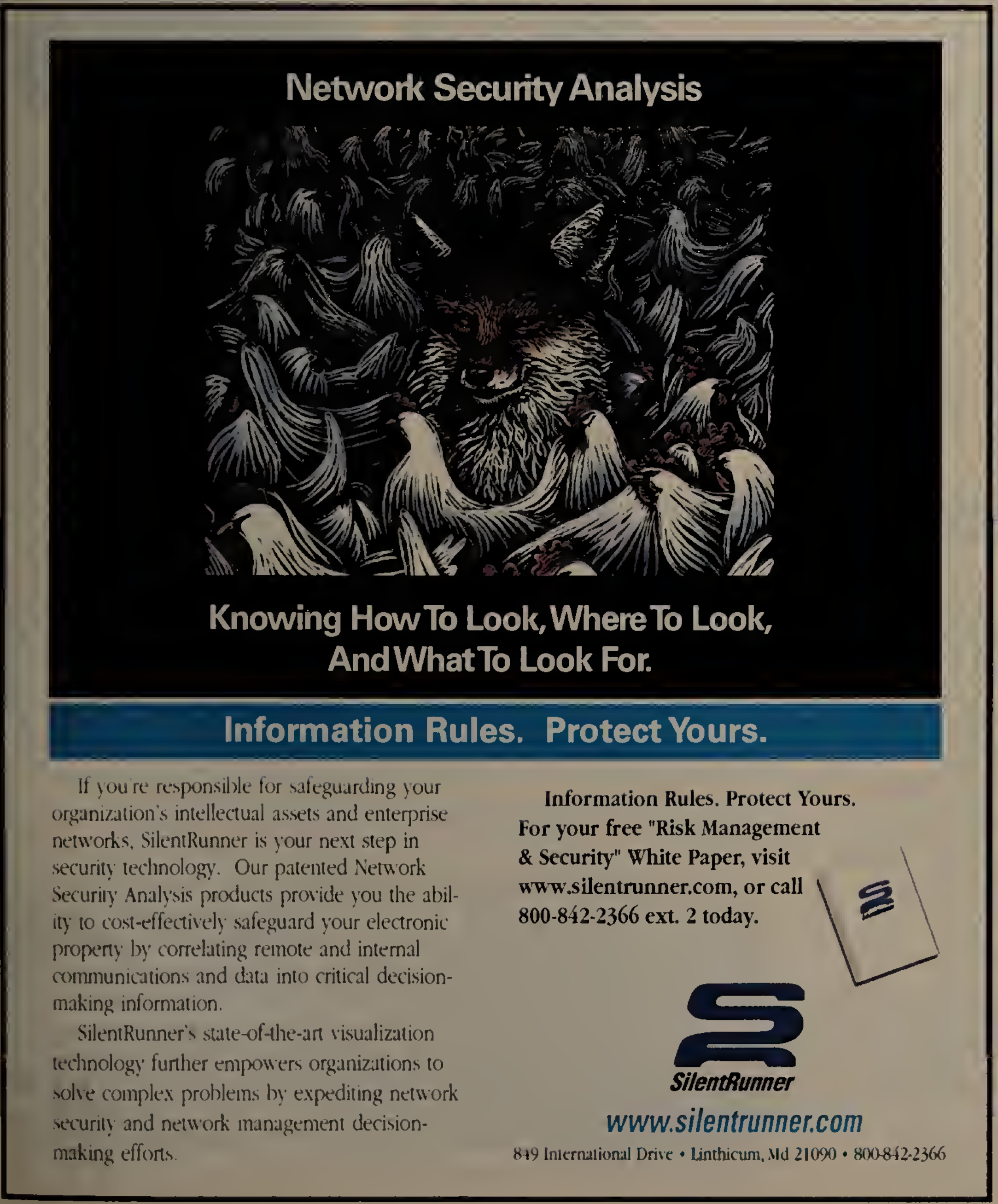

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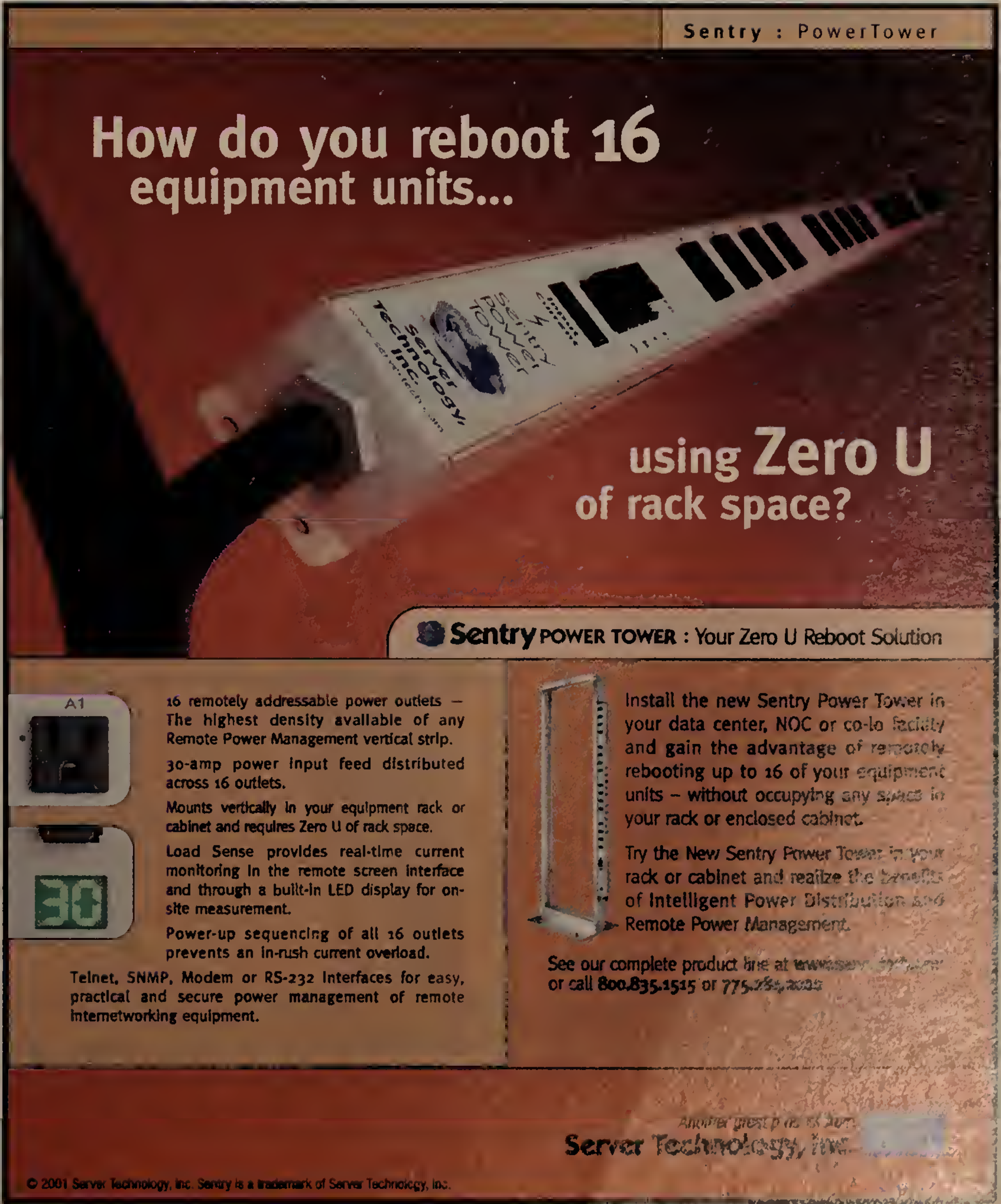

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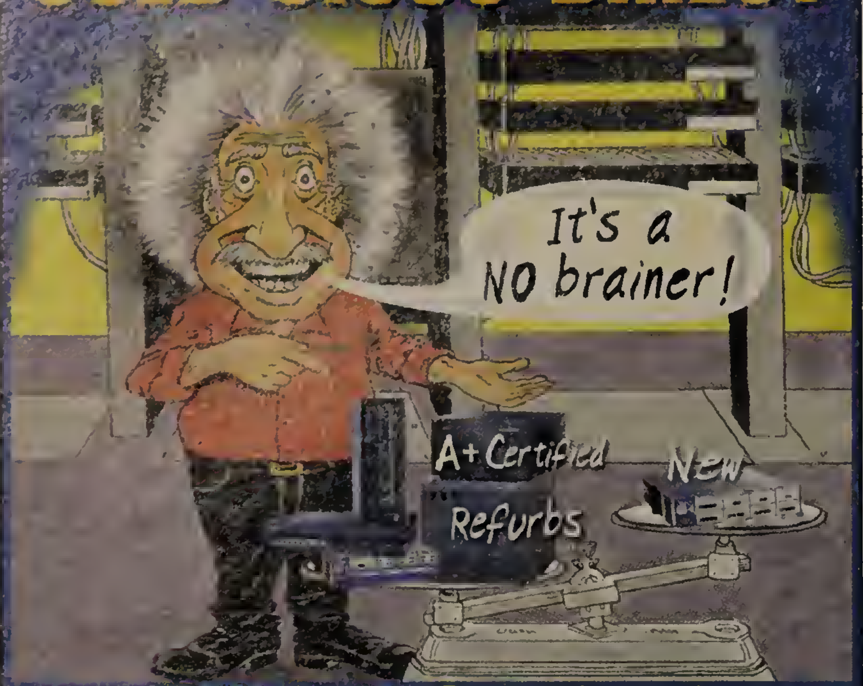

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Design, develop, test and implement specialized software apps using (a) PVCS Tracker, StarTool, Lotus Notes, Comparex, C, C++, Oracle, COBQL, Test Director and related testing tools: (b) Weblogic, Corba, Java, SAP, ABAP/4, Visio, Rational Rose, Clearcase, Cold fusion; (c) Sybase, Lotus notes, Replication Server, Toad, Rapid SQL, C, C++, PFC, Power Designer, Rational Rose; (d) Cold Fusion, Rational Rose, Sybase, IIS, Iplanet, XP, ASP, XML, JSP, Oracle; (e) Websphere, Homesite, Corba, Rational Rose, Oracle, EJB, C, C++, DB-2, Websphere Studio, C, C++; (f) Oracle/Sybase DBA and Adaptive Server for manufacturing and service organizations; (g) People soft Financials-AR, AP, GL, Oracle, Peopletools, Peoplecode, nVision, Crystal Reports. US Workers only. Consulting positions requiring travel. Prevailing wage/benefits. Send resume to HR, SSG 3300 Buckeye Rd., Suite 555, Atlanta, GA 30341, identifying interested position(s).

Director of Information Services for Int'l Branch of Household Products co. in Miami. Responsible for dsgn, research, dvlpmt & technical svc of co's specialized IT dvlpmt, n/work d/base dsgn, intranet, internet & system analysis & administration activities for CIC's group of co's both at home & abroad. Direct engg svc of WAN, LAN & mgmt n/work s/ware systems & technologies. Provide tech support in the application of specialized trouble shooting techniques to analyze, diagnose & solve specific n/work d/base malfunction problems. Provide engg training & technical instructions to Co's other info systems engineers in provision of internet & intranet communication solutions. Dvlp & update conventional web-based d/base, mgmt n/work & graphics technologies & related info system engg processes pursuant to specific technical reqmts, specs & criteria defined by Co's Sr. Engg Mgrs. Apply advance engg technologies to provide engg support for improving reliability & performance of Co's proprietary info systems & network communications technologies. Update Co's current engg reqmts, specs, criteria & stds utilized for n/work communication activities in this rapidly developing IT field. Responsible for innovation of specialized network, database systems & dvlpmt of variety of specialized qlty control & trouble shooting in this field. Dvlp specialized engg reqmts & criteria used to provide info system engg support of sophisticated mgmt network systems. Formulate engg & dsgn strategies in anticipation of future technical demands in this highly specialized technical field. Reqmts: Bach deg or equivalent in Comp Sci, Engg or related field. 6 yrs exp in the job offd or 6 yrs exp as Info Services Director/Manager. Will consider applicants w/any suitable combo of education, training or exp. Respond to: The Clorox International Co, 5301 Blue Lagoon Dr, Miami, FL 33126, Attn: Christine Kesl/Maggie Frenero.

Software Engineers-Will work in various unanticipated locations throughout the US. Analyze, develop, and manage software systems for clients, focusing on application servers and database in a hybrid environment, such as Authoria HR, Genesys, Scopus Webteam, IIS and Oracle database. Support CTI applications and backup all NT servers. Install shield package. Use C++, Oracle SQL, SDS, Tivoli, Unix scripts, and CGI as tools. Reqs: Master in Computer Science, Comptuer Engineering, or Information Systems and 1 yr exp in the job offered. $71,392.50/yr, 40 hrs/wk, 8a-5p, M-F. Mail resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CQ 80202-2117, and refer to refernce number CO5017029. Application is by resume only.

Software Engineer:
Senior Embedded Perform embedded development using VxWorks, Simple Network Management Protocol (SNMP) and Abstract Syntax Notation 1 (ASN.1). Develop distributed computing environment and perform networking using C, Synchronous Optical Network (SQNET), Ethernet, Bellcore/Telcordia standards. Requires Master's in CS/EE/ME or academic equivalent and 1 yr. experience as a Software Engineer or as a Systems Analyst. (Bachelor's in CS/EE/ME or academic equivalent plus 5 yrs. of progressive experience acceptable.) Interview and job site in Acton, MA. 8am-5pm, 40 hrs/wk. Wages: $100,000/yr. Send 2 resumes to: Case # 20011543, Labor Exchange Office, 19 Staniford St., 1st Fl, Boston, MA 02114.

Hutchison Whampoa Americas Ltd (HWL) seeks Dir of Bus Dev for Bellevue Office: DESC: Id & rsrch new tech & bus opps for HWL. Dev & mng deploy of HWL global speech tech strat's. Id & rev global standards & req's, vendor selection, contract terms/items, prod dev, fac. integration of var country plans. Analyze & deter. bus & tech req's of next gen wireless oper units. Id & rsrch new s/w, h/w & emerging tech, trends & market dev's consistent w/ H3G bus strat's in enabling tech areas incl voice recog, messaging & loc enabled app's. Perf. feas studies & cost/ben analyses for tech & bus initiatives. Eval new & exist bus plans, due dilig, & make rec's on potential acquis. targets. Util CRM, d/b & financial modeling. REO: MS in Bus Admin, Bus, MIS, Fin, or Econ + 5 yrs of exp mnging & executing full life cycle ERP s/w dev proj from incep to delivery. Analyzing bus proc & info sys's & prov tech solns for bus req's & needs. Dev & exec global s/w marketing & sales strat's. Cndct feas studies & perf cost/ben analysis for tech & bus initiatives. Must be fluent in Cantonese & Engl. Pls send resumes to L. Putzel, HW-101, HWL, 10900 NE 8th St., Suite 1488, Bellevue, WA 98004. Job# required.

Systems Analyst Programmer. Plans, develops, test & docs computer programs, applying knowledge of progr. techniques & computer systems. Resp. for designing Web pgs & writing HTML & Cold Fusion scripts for an Asset Mngmt Tracking System known as Scanman. This system will be undergoing major development as it replaces several outgoing legacy systems. Duties include the dev of intuitive interfaces, appropriate product delivery, & dev solutions to correct any existing software problems. Req 3 yrs exp in job/ 3 yrs exp as a Business Analyst (computers), Proj. Mngr (comp.), &/or Mngr, Spec Proj (comp.). Job/Intvw Site: Colorado Springs, CQ. $56,950/yr. 40 hr. wk. 8am-5pm. Must have proof of legal authority to work in U.S. Mail resume to: Colorado Department of Labor & Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Ste. 400, 1515 Arapahoe St., Denver, CQ 80202-2117, & refer to order #: CQ 5016395. Application is by resume only.

Corbis Corp. seeks Data/Info Sys's Analyst for Seattle Office. DESC: Monitor, maintain, & upgrade corp info sys's & DB's. Test, evaluate, & update h/w & s/w to determine efficiency, reliability, & compatibility w/ existing sys. Dev & impl stored procedures & file triggers to mod & cust info sys to meet evolving bus req's. Monitor DB & sys usage & perf. Maintain & admin data replication. Plan & execute DB backups, sys recov. & data, schema & config changes. REQ: 3 yrs of exp in skills & tech's listed above. Exp may be gained concurrently. Pls send resume to K. Avaiusini, CB-101, 15395 SE 30th Pl, # 300, Bellevue, WA, 98007. Job# required.

Digeo seeks Lead S/W Architect for Palo Alto, CA office. DESC: Arch, dsgn, & impl. highly scalable data distrib. sys, apps, & middle ware data access & comm. layers for trans. of dig. TV brdcst. & multimedia datacast util. C/C++, XML, RDBMS Linux/Unix, & Win. Ensure secure trans. of data from head unit to set top boxes via hybrid fiber coaxial netwks util. TCP/IP, HTTP, FTP, multicast, MPEG-2 datacast, & gen. cryptography like digital sig, DRM, & SSL. REO: BS in CS, Math, or EE + 5 yrs exp. dsgn. & dev. netwk. apps. util. C/C++, TCP/IP on Unix, & Win. In add., 2 yrs exp. dsgn, dev, & impl. highly scalable secure data distrib. sys. util. internet arch. & protocols, TCP/IP, HTTP(s), FTP, Multicast, XML, DRM Sys. & Cryptography Prem. sal + bns & benes. Pls. reply to HR, Job # DI-102, 8815-122nd AVE NE, Kirkland, WA 98033.

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- SAP/R3, ABAP/4 or FICO or MM & SD
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- Lotus Notes Developer
- UNIX System Administrator
- UNIX, C, C++, Visual C++, CORBA, OOD or OOPS
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StructuredWeb, Inc. is seeking a Chief Technology Officer, R&D Manager to Lead internet development & IT groups. Qualified applicants will have 10 yrs exp in job offered or 10 yrs exp as Software Engineer, Team Leader or Product Development Manager. Must have exp w/ object-oriented dev, C++, VB, VMS, Windows, UNIX & new product/software development. Please send resume to: Attn: Daniel Nissan, Structured Web, Inc. 110 B Meadowlands Parkway, Secaucus, NJ 07094. No Calls Please.

Software Engineer (multiple positions) wanted by Co involved in electronic distr of fin. research in NYC, to develop/create & modify database-driven Web appls and general comp appls; analyze fin business logic and dev s/w soln; design s/w and opt operational efficiency; design and implement new features, req'g changes or additions to existing database. Must have BS in Comp Sci or Syst. Eng or Info Syst or Electrical/Electronic Engg and 2yrs exp., 9-5p. Res: HRD, Multex.com, Inc., 100 William Street,NY, NY 10038.

SAP Consultant: Perform SAP implementation to module SD, MM, WM, SM, ASAP; design/configure R/2, R/3, R/3 IS-U; develop training material & conduct training; write programs for data conversion; configure resource related billing, classification system & variant configuration. Extensive traveling. Req 4 yrs work exp. hrs: 8a-5p. M-F. Send resume to Baer Group, 53 Perimeter Center E Ste 100, Atlanta, GA 30346. Ref WG.

Computer Programmer: Develop telephone billing software for voice processing using Visual Basic, VB Script and JAVA; convert data from project specification in SQL Server 6.5 and 7.0. Req Bachelor's degree in CS plus 3 yr work exp. Hrs: 8a-5p, M-F. send resume to Ashar Syed, UKI Communications 720 Hembee Place, Roswell, GA 30076. Ref SS

Quantitative Analyst wanted by Software Dvlpmt firm in NYC to perform research in analytical & computational methods in financial engineering. Must have Master's in Math, Com Sci, Physics or Finance & 2yrs s/ware exp in job offered or as College Instructor in Math. Respond to: HR Dept, Imagine Software, Inc., 233 Broadway, 17th fl, New York, NY 10279

Computer Support Specialist-Chantilly, VA. Provide technical assistance to computer system customers; install software & configure systems; investigate & resolve computer problems. B.S. in C.S. or C.I.S. 40 hrs/wk. Salary $26K. Resume to D. Park, #335, Xram, Inc., 4132 Westfax Dr., Chantilly VA 20151.

SQL Integrators has multiple positions available. Job duties include: Design, develop, and enhance Oracle based applications and databases for a variety of clients in the Philadelphia area as well as throughout the U.S. Perform Oracle database adminstration. Perform work on multiple platforms and with multiple databases. Applicant must have B.S. degree in Computer Science, Mathematics, Engineering or Business. Applicant must also have 5 yrs. exp. in the job duties described above. Send resume & cover letter to: SQL Integrators, P.O. Box 1472, West Chester, PA 19380.

Computer Network Engineer wanted by Co involved in electronic distr of fin'l research in NYC, to maintain/troubleshoot WAN & LAN, Network OS, storage sys, design using fusion tech, implement redundancy, manage name resolution, write scripts to integrate/automate monitoring, security, load-balancing. Must have BS in Comp Sci. or Syst. Eng., or Info Syst., or Electrical/Electronic Engg and 2yrs exp., 9-5p. Res: HRD, Multex.com, Inc., 100 William Street, NY, NY 10038

User Support Analyst for job located in Miami, FL. 40 hour week, 4:PM-12:midnight. Bachelor's or foreign degreee equivalent in Electronic Engineering or Computer Science. 2 years experience in job offered or 2 years as Computer Maintenance Engineer. Investigate and resolve computer software and hardware problems; apply knowledge of computer software, hardware and procedures; talk with coworkers to research problems and find solutions, install computers, software and peripheral equipment. Submit resume to Dr. Jack L. Sparks, 11155 SW 112 Av., Miami, Florida, 33176 or fax: 305-595-4162

Information Center Specialist (Atlanta, GA): Coordinate Internet based application for e-commerce, database management, administration, etc. Utilizing Oracle, VB, C++. Requires: 1 yr. exp. in job offered & B.S. in IT or a related. Exp. ref. required. Send resume to: Media First, 1430 Peachtree St., 7th Flr., Altanta, GA 30309.

Software Engineer: Perform PeopleSoft upgrade & data conversion on HR-Payroll & Benefits Admin; design/develop/modify custom packages in PeopleSoft HRMS, PeopleSoft Distribution & PeopleSoft Financial. Req 2 yr college edu plus 5 yrs work exp. Hrs: 8a-5p, M-F. Send resume to James Barber, IIG LLC 2500 Northwinds Pkwy, Ste 200, Alpharetta, GA 30004, Ref VP

Programmer/Analyst

Plan, develop, test, & document software using Lotus Notes & Domino. Analyze user req'ts & create or upgrade software as necessitated. Create user manuals & conduct training sessions for end users. Req: BS (or equiv) in Comp Sci, Comp Engg, or Elec Engg , & min 2 yrs exp. Resume: HR Dept, Canbis LLC, 166 Griffith St, Jersey City, NJ 07307.

Database Administrator. Perform Oracle DBA tasks. Optimize DBs for use w/ SCT Banner apps using Oracle RDBMS. Implement new tech for Oracle and Banner DBs. Bachelor degree in CS or sim field req'd, as is 6mos DBA exp & exp w/ Oracle RDBMS. In lieu of 6 mos prior empl exp, will accept exp w/ Oracle RDBMS thru 6 sem-hrs of Sr-level, undergrad course work. Compet salary. Specific inquiries to Tom Steffes, Job #1505.07, 801 National Road West, Richmond, IN 47374.

Senior Software Engineer sought by software development firm in Downers Grove, IL. Design; develop implement collaborative commerce related Internet applications; Analyze and draft SRC and FRS; supervise software quality assurance product testing; provide sample analyses of customer production work-flow processes; coordinate pre-sale demonstrations and trade show exhibitions. Must have M.S. in Computer Science or its equiv. & 2 yrs exp. as Software Engineer. Respond to: HR Dept., 2651 Warrenville Road, Downers Grove, IL 60515.

Computers - Manager (Richardson TX). Apply PMI/UML methodologies to oversee development of multi-tiered management software, e-commerce and related applications for manufacturing co. Use C, Java, VB, & add'l languages/tools. Build IT team. Reqs Masters Comp Sci & 5 yrs exp. Fax resume to (972) 498-9615 Attn: R. Hyne

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IT Careers in Consulting

The consulting landscape has changed much in the past six months with projections for hiring lower than in prior years and hiring occurring more and more with second and third-tier firms vs. the traditional Big Five. RHI Consulting's quarterly CIO Hiring Index indicates a 10% increase in IT hiring for the second quarter, focused primarily on New England and West South Central States. Consulting projects will involve those affecting the bottom line – operational efficiency and increased productivity – as well as IT security.

David Reingold, senior vice president at **Computer Horizons** based in Mountain Lake, NJ, said the hottest area for his firm is Chimes, a business unit that provides human capital management expertise, particularly in the area of e-procurement and human resources. To staff the firm's consulting work, Reingold looks for people who have a broad education. "Someone who has a narrow education and knows only technology probably won't be as successful as someone with a well-rounded background," he says.

In addition to hiring individuals to run client projects, **Computer Horizons** also will look for people with experience in managing consulting operations. "We see some expansion for us operationally (branch offices) this year, requiring these skills," Reingold says.

In addition to Chimes, **Computer Horizons** provides clients with staffing and professional services, and has a solutions division that builds, tests and delivers systems to clients. Approximately 65% of the company's revenues come from Fortune 100 clients.

"We believe every IT professional should spend some time in consulting, to see the diversity of multiple industries and applications and approaches," Reingold adds. "As a consultant, you are apt to be responsible for a deliverable very early in your career, which is important when you look for your first management job."

At **RHI Consulting**, the demand is hot for consultants in the areas of network security and infrastructure security, in general. Katherine Spencer Lee, executive director of **RHI Consulting**, says, "There is also increasing demand for data maximization. We went through a period in IT during which we were data gatherers. Now, businesses want to benefit from that information to build repeat business."

Lee says that in selecting candidates for **RHI Consulting**, she looks for a resume that goes beyond a laundry list of technical skills. "We want to know specifically what you contributed to a project. A couple of years ago, the focus was on the technologies you could use. While, of course, it's still crucial, today we want to know what you can do with that technology."

Lee maintains that the career path for IT professionals in consulting is still strong. "If you have a solid base of current skills and know the importance of softer skills – how to communicate with all levels of an organization and manage a project – you can have a phenomenal career. IT people who know strategy are sitting at the boardroom table, focused on turning company desires into reality." **RHI Consulting** connects consultants with projects, but the company also has a "bench practice" of full-time consultants.

For more job opportunities with consulting firms, turn to the pages of ITcareers.

- If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.
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BackSpin Mark Gibbs

Covering Web services

"Interesting column last week on Web services and XML," said my esteemed editor, "but what exactly does it mean for businesses to know where their data came from?" Dear editor, good point ... let me expand.

In the majority of companies, data about business exists with limited context. Let's say that you make pumps for medical use. A pump impeller is returned because of corrosion. What happens?

You probably will look for how you built that pump. You will search files for the production records to establish where you got the impeller and when you received it. You then will call the manufacturer and tell someone the problem. He'll go on a paper chase that might result in another call to another vendor, and so on. It will turn into each of you thrashing around to establish the facts with often erroneous unstructured data that is weakly linked to relevant supporting data. In short, you've got lots of data but very little information.

In the real world, this process of finding, validating and correcting data and trying to extract information occurs endlessly and at great cost. Part of the problem is that, as we compile data we don't validate it — we don't convert it into information.

How often have customers complained that your company has their name, address or some other fact about them wrong and moaned about the time and effort it took to fix it.

In commerce such mistakes happen with monotonous regularity, and the consequences get amplified wildly. A wrong spelling sends goods to wrong destinations, a wrong name sends invoices to wrong parties, and a typing error sends telephone calls to little old ladies in Peoria who are hard of hearing and wind up screaming "Eh? What?" into the phone as you try to establish the number you called. In short, such mistakes cost dearly.

This is where the concepts of XML and Web services start to pay off. Once businesses begin to structure data at the source — at the point of acquisition — the chances of error are reduced significantly. If you can refer a supplier to your Web service that establishes a business-to-business relationship with the supplier, there's a high probability that unless your company has been really stupid and entered the wrong data, the supplier will get your details right and you will get theirs.

Why? Because in an XML and Web services system data can't be created without validation. And once it is known to be correct, the transformations between schemas — from account data to purchase order to waybill to delivery note to receipt to money transfer — require that the context of each schema be "mappable" to the next context. Consequently, mistakes will be hard to make and won't propagate through your systems because the data describing the transaction will be self-auditing. This means when you buy something you will know the entire workflow that led to that acquisition just as you will know how a product came to be built and shipped.

This process is central to the whole concept of XML dialects such as ebXML, an international standard supported by the United Nations Centre for Trade Facilitation and Electronic Business, and the Organization for the Advancement of Structured Information Standards.

But this highly ordered nirvana where all firms use structured data and can collaborate with ease and accuracy won't be with us soon. The majority of businesses aren't about to change without significant market forces making the "old ways" untenable and the new ways a requirement to be in the game.

But it is going to happen — we see the concepts of Web services are already paying off for early adopters (www.nwfusion.com, DocFinder: 9134). Your problem with Web services will be deciding whether you want to jump in now or be pulled in later.

So honored editor, does that cover it? [Thanks — Ed.]

Cover yourself at backspin@gibbs.com.

'NetBuzz News, insights, opinions and oddities

Paul McNamara

We will pay for all this privacy

The Internet Privacy Fife and Drum Corps has been making quite a racket recently. Witness:

- Freshly filed legislation from Sen. Fritz Hollings (D-S.C.) that would force e-commerce sites to divvy up personal information into "sensitive" and "non-sensitive" piles and apply a different set of privacy standards to each. It also would make easier that favorite of American pastimes: litigation.
- The World Wide Web Consortium's blessing of the Platform for Privacy Preferences (P3P), which if it works as advocates envision — a big if — will give 'Net users notice of what they can expect in terms of privacy protection from whatever site they stumble onto.
- The Federal Trade Commission's $35,000 fine against an Ohio company for violating new regulations that prohibit Web sites from obtaining the personal information of children without first getting parental consent. (The company that was fined makes the world famous Etch-a-Sketch, which doesn't immediately strike me as the type of online threat parents might worry about.)

Buzz has never marched to the same beat as those who seemingly lie awake nights fretting that some e-commerce outfit will peddle their e-mail address or shopping history. Sure, in the abstract, I'd rather that not happen and believe that Web merchants should adopt, publicize and respect meaningful privacy policies. Most reputable businesses already do this.

But the prospect of all these privacy "fixes" — especially the political ones — creating more problems than benefits seems all too real to me.

Same goes for Jim Harvey, an attorney with the Atlanta law firm of Alston & Bird, who specializes in advising large corporations on how to handle the expanding potpourri of privacy laws and regulations. Harvey has an obvious bias here, given the nature of his clients. But he's also right about the burdens these efforts are going to place on Web merchants.

Take the Hollings bill, for example.

"I think there's good and bad in the bill; the best part being that it would preempt inconsistent state laws, which will help businesses immensely," Harvey says.

"However, one of the things that is going to give the business world great concern is the fact that it only covers online businesses, and therefore could legitimately be said to disadvantage online businesses," he adds. "It also establishes a private right of action, which [may] provide more class-action fodder."

In other words, if this bill becomes law, watch for a spate of frivolous lawsuits over the "misuse" of personal information.

"It will be very difficult to pass something related only to online privacy," Harvey predicts. "And it will be very difficult to pass something that doesn't impose a lot of costs on businesses and therefore consumers."

The preoccupation with online privacy — as differentiated from security and identity fraud — has always seemed puzzling given the apparent lack of a similarly heightened concern relative to the offline world. For example, most consumers — including this one — seem perfectly willing to part with a good deal of personal information in exchange for a good deal from, say, the local grocery store. And yet those folks operate right around the corner from where we live.

As for the expenses businesses can expect to incur, Harvey cites the case of one client who coughed up $2 million — just for postage — in an effort to comply with the federal Gramm-Leach-Bliley Act that defines privacy standards for the financial industry.

No one would suggest that online banking shouldn't be regulated, just that all these measures stand to benefit from sober cost-benefit analysis, which unfortunately is something the political process does not generally handle well.

And all this comes before we even consider the mishmash of privacy initiatives from foreign governments, which, as Harvey notes, often require different approaches that are inherently irreconcilable.

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